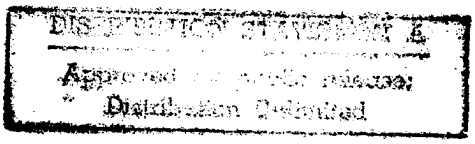
JPRS-UMA-84-022

15 MARCH 1984



USSR REPORT

MILITARY AFFAIRS

FBIS FOREIGN BROADCAST INFORMATION SERVICE

JPRS-UMA-84-022

15 March 1984

USSR REPORT

MILITARY AFFAIRS

CONTENTS

ARMED FORCES

ROLE OF WARRANT OFFICERS PRAISED

Moscow KRASNAYA ZVEZDA in Russian 11 Dec 83 p 1

[Editorial: "Army and Navy Warrant Officers"]

[Text] The fighter pilot, still not cooled down from the aerial battle, excitedly talked in the altitude chamber about the problems of a difficult skirmish in the stratosphere and thanked the non-flying specialists for excellently preparing his equipment. Then he turned to master of military qualifications Senior Warrant Officer V. Voronin.

"And a personal thanks to you, Vyacheslav Davydovich, for the excellent condition of the high altitude equipment."

The Senior Warrant Officer had the occasion to hear a great number of sincere thank-you's in his 30 years of service in the Armed Forces. He had already heard them before he remained on extended service and after he became one of the first in aviation units to gain the rank of warrant, and later, senior warrant. He is now filling an officer's position as chief of the high altitude equipment group. The group has had an outstanding rating for 7 years.

"A competent specialist, a skillful educator of subordinates, a Party activist and a reliable commander's assistant," is how his chief characterized Senior Warrant Officer Voronin. Commanders gave these same characteristics to Communists senior warrant officer of a major anti-submarine command and master of military qualifications Senior Warrant Officer T. Bagryantsev, Company Senior Warrant Officer N. Shevtsov, technician of a specialist group 1st Class Warrant Officer A. Pisarenko.... We will not list all who by their zealous military service, thorough knowledge of equipment and exactingness and concern for subordinates and Party principles have achieved honor and respect and the right to such high command evaluations.

The word "praporshchik" is derived from the Old Slavonic "prapor," which means banner. Thus in Russia at one time standard bearers were those designated from among the bravest warriors. Later in the Russian army the military rank of "praporshchik" [warrant officer] was established. The rank of "michman" [naval warrant officer] has also left a deep impression in military history.

After the 1971 introduction of army and navy warrant ranks into the Soviet Armed Forces, a new detachment of professional military cadre closely tied to the officer corps joined the military rank structure of the Motherland's defenders. This measure of state importance was dictated by experience, the revolution in military affairs and by the new demands on the level of military specialized education for commanders at all levels. This resulted from the complicated missions of training and indoctrinating fighting men under modern conditions. The 24 December 1980 USSR Supreme Soviet decree establishing the rank of senior army and navy warrant officers in addition to the existing military ranks and the USSR Council of Ministers resolution on the partial change in the order of passage in the military service for warrant officers is still further evidence of the Communist Party's and the Soviet State's concern for strengthening the Armed Forces and increasing the authority of the officers' primary assistant. The statues of passage through service envisioned the possibility of warrant officers gaining an officer's rank under certain conditions.

The service by army and navy warrant officers has been honorable and responsible. They have gained a wide circle of responsibilities. Let's recall at least a part of the responsibilities of the platoon commander, and the sergeant major of a company, squadron battery or detachment. They are responsible for the correct performance of duty by soldiers, sailors, sergeants, and sergeants major, and responsible for the military discipline in sub-units. They must know each subordinate well, and know their personalities. They must show fatherly concern for their fighting men and have the ability to conduct exercises in military and political training at the required methodological level. Warrant officers who are the senior man in a sub-unit are the direct superiors of the sub-unit's soldiers and sergeants and they are entrusted to fulfill the duties of the company commander when the officers are absent.

It is possible to accurately determine what type of company or detachment senior a soldier or sailor has by his appearance while on leave. If the military man is erect, polite and dressed neatly, without any uniform violations, it is apparent that his senior is a demanding, caring chief. Directing their efforts towards supporting military discipline and regulatory order in the sub-unit, the warrant officers themselves must serve as examples everywhere and in all matters, and attract soldiers, sailors, sergeants and sergeants major to selfless military work.

The contribution of army and navy warrant officers in successfully resolving military and political training missions, teaching and indoctrinating army and navy personnel, strengthening discipline and increasing military preparedness of units and ships is significant and heavy. As experience shows, the abilities of warrant officers are most fully revealed in those units where the military trade of fighting men is forged. All the same, there are instances where some warrant officers try to get assignments not where they are needed, but where it is easy and where they have no subordinates. Such warrant officers demand attention and an in-depth explanation of those missions and roles which are entrusted to them when they are assigned to duty.

It is not easy to become authoritative and knowledgeable in the business of commander-educator, a high-class specialist. It is not easy to fill the responsible duties well, to always be equal to demands assigned to military cadre by the Communist Party. This requires high ideological tempering, complete knowledge of military equipment, mastery of tact and the methodological skills of teaching and indoctrinating subordinates, the creative application of all the new, advanced educational practices in service to the institutions.

The officers' closest assistants receive a fixed reserve of political, specialized and pedigogical knowledge in warrant officer schools where training is organized according to advanced experience accumulated in the forces. As a rule, the exacting selection of suitable candidates precedes training. However, the real formation of warrant officers as commanders-instructors and masters of their business takes place while they serve in units and on ships.

Commanders, political workers and chiefs of various services must take this into account. One must always remember the duration of warrant officer development depends on how they meet yesterday's cadet in the sub-unit and how they help him to master the required duties and resolve daily questions. Many commanders and political workers do not grant the power to clearly organize commander training and patiently inculcate in army and navy warrant officers the love of working with subordinates, as educating people is a large and complicated art which must be mastered persistently and daily. With their sensitivity coupled with a high degree of demand, these officers provide a worthy example for their primary assistant to imitate. Where strictness is replaced with courseness and exactingness with an all-forgiving attitude, warrant officer development is delayed, some of them are deliquent and they begin to relate to the service, as they say, in a slipshod manner.

A healthy moral micro-climate in the military collective, a spirit of good comradeship, mutual help and support and having principles and exactingness promote the constant growth of skills and the successful development of warrant officers. Initiative gushed out in this kind of collective and the flame of socialist competition is high.

The party and Komsomol organizations have a great role in educating warrant officers with communist conviction and a conscientious attitude toward military work. They are urged to attract this type of military person into an active, public life, to summarize and propagandize the experience of those moving ahead. There are many such people in units and on ships. However this does not give party and Komsomol activists the right to let out of view "middle peasants", and even more so, those who are not examples of service and discipline, whose professional training and moral quality are not equal to the high requirements of an officer's primary assistant.

The rank of warrant officer obligates them to meet their military duty and their responsibility to the service with honor and dignity, to be conscious of their personal responsibility for military preparedness and the level of military discipline in sub-units, units and on ships. So as to always be equal to the demand made on them, warrant officers are called upon to tirelessly continue improving their military skill, to actively participate in socialist competition under the motto "Be on the alert and constantly ready to defend socialist achievements," to set the example of devoted service to the Socialist Motherland.

12511
CSO: 1801/161

NECESSARY ASSISTANCE DENIED TO NEWLY ASSIGNED OFFICER

Moscow KRASNAYA ZVEZDA in Russian 6 Dec 83 p 2

[Article by Engineer Lieutenant Colonel Ye. Natalich, Southern Group of Forces, entitled "Why Be Indifferent"]

[Text] After completing military school Lieutenant S. Teterkin was assigned to the position of shift supervisor in a radar station. The officer was certainly lacking practical skills. One day Teterkin turned to an experienced specialist, Captain G. Shneyderis and asked for advice on how best to tune one of the station's systems. The captain reacted very strongly to the request. Explaining nothing, he himself tuned the system and said:

"There will be time later, take your time...."

The Lieutenant yet another time asked Shneyderis to help him understand the subtleties of work on the equipment. However, the captain, busy with something else, waved him off with annoyance.

"I don't have time. Some other time...."

But he never found this other time for the young officer. And thus Teterkin got the fine points in mastering the equipment himself.

Where am I leading this conversation? It is precisely as a result of such kind of attitude toward young specialists (and such occurrences are not the exceptions) that their knowledge as well as their ranking will increase slowly.

There is another side to this question. An indifferent attitude to a young specialist and refusing him help and support have an adverse effect on his mood and initiative.

Once during a military operations period Private V. Karabayev allowed a gross error. When they began to clear up the reasons, they discovered that the soldier had gone more than once to the platoon commander Senior Lieutenant S. Kuznetsov with a request to help him look into one of the complicated issues. But Kuznetsov would unceremoniously wave off the request. He would say that this was outside the purview of your responsibilities and better

work in your own area. And the soldier showed no more initiative and managed with a minimum of knowledge and skills. That is why he did not cope in the complicated situation and let the whole platoon down.

The training of skillful specialists and real masters of military affairs is our common concern.

12511
CSO: 1801/161

PROBLEMS IN OPERATION OF PX SYSTEM NOTED

Moscow KRASNAYA ZVEZDA in Russian 6 Dec 83 p 4

[Article by Lieutenant Colonel E. Khorevich, chief of the Trade Directorate, Red Banner Far East Military District: "Goods For The Hinterlands"]

[Text] Not long ago a complaint from soldiers served by the PX headed by Soviet Army employee V. Dronov reached the District Trade Directorate. Soldiers and sergeants reported that the store in their garrison at times lacked several items of military goods. A check revealed that these goods, such as undercollars, emblems and shoulder boards about which military personnel wrote, were in abundance in the PX base. Why were they not on the shelves? Because neither the sales personnel nor the store manager nor any other PX workers were concerned about this.

Yes, one often still has to see such a scene. A buyer inquires when some needed article will be in the store, but the salesperson cannot give an intelligible answer. This is a serious defect in our work. It is even more intolerable in a distant garrison where there is no one to correct the salesperson's error.

However, it also happens that the base is genuinely unable to fill the store's order. But again not because the sought-for article is not available within the district. It has accumulated in one of the garrisons, but base workers don't suspect it. This is undoubtedly the fault of the PX trade departments, the administration and primarily of the goods managers in charge of studying the demand of the inhabitants. Where the assortment of goods and their turnover are continuously studied, such an occurrence is impossible.

Now we have established the practice of getting a quarterly report from PX's to the Trade Directorate. This report covers shortages of goods in the remote garrisons and purchaser demands for them. We analyze which brands of refrigerators, televisions, radio receivers, etc. are selling and which articles are not. On the basis of this analysis corresponding changes are put into our plan. Only this year, for example, deliveries of "Neva", "Kiev" and Chayka" brand electric razors and "Biryusa-3" refrigerators to remote sites were significantly lowered and deliveries of the "Berdsk" and "Agidel'" electric razors and "Biryusa-6" refrigerators were increased.

True, this system is also not flawless. I again remember the case of the undercollar shortage. Indeed, several commerce workers are putting all their attention on studying the demand for the expensive goods on which, to a significant degree, the trade circulation level depends. And the "little things" are not considered. To have customers always find necessary items on the shelves, I believe it is necessary to inculcate a sense of responsibility in workers.

The fact that we now receive information on the demand for goods also from unit commands and the community helps to avoid such errors. For example, in all the district's garrisons a public commission monitoring the work of commerce enterprises is operating. They consider buyer orders and control the delivery of goods.

Unfortunately in many remote garrisons there are still no PX's. At times there is simply no capability for allotting them a location, there is no means of transport to deliver the goods and there is no reason to keep a civilian commerce worker as the demand for goods is very limited. In these situations mobile shops, floating stores and even helicopters are a help. Every day, according to a fixed schedule, they deliver the necessary goods to remote garrisons. For example, managers of floating stores V. Ruditsa and B. Laptev and mobile salespersons G. Malova, Z. Tsareva and others are working conscientiously.

But there is yet another method. This is the creation of so-called house shops where an inhabitant of the location is responsible for the goods left in the town or self-service kiosks are located in the soldiers' barracks. It is only important for commanders and sub-unit senior sergeants to be receptive to such trade arrangements and to assist in the work of our "micro-points". This is how things are proceeding in the small town where N. Goryunova has headed the house shop for already 3 years. Customers are satisfied with here work.

At Party economic activities and Party meetings we regularly discuss the question of further improving trade facilities for inhabitants of remote garrisons and providing them with all the necessities. Not long ago these issues were also reviewed at district military council meetings. There they stressed the necessity of improving the food and industrial goods provisioning of remote garrisons.

Much has been done in this regard in recent times. Quality stores and studios, dining and confectionary shops and repair and service combines are being built in garrisons. For example in a certain garrison a whole complex including a repair and service combine, industrial and food-stuffs stores, a cafeteria and a pastry shop were put into operation. At remote "points" the manufacture of officer military uniforms made from half-finished products is done more and more often. This almost halves the completion time for an order. Among those whose customers speak warmly about them are masters of high qualifications B. Kogan, M. Bondarchuk, B. Polyakov and others.

We have begun to conduct more regularly bazaars, fairs and servicing days. Workers of the military trade organization headed by Soviet Army employee A. Sudakov are showing an exceptional amount of initiative in this area. Included in the moblie serve groups are salesmen and cooks, tailors and cutters, photographers and craftsmen who repair various domestic appliances turn out. On such days people can buy various manufactured and food items, order ready-made clothes, have photographs made, repair watches and have clothes dry-cleaned. It is also important to note that many goods are delivered and services rendered based on preliminary orders from servicemen and their families.

Life is placing ever new, ever more complicated tasks before commerce workers to study buyer demands from all angles, increase the level of their service and provide the necessary goods to all. Our responsibility to it be equal to the demands of the times.

12511
CSO: 1801/161

EDITORIAL GLORIFIES YOUTH'S OPPORTUNITY TO SERVE MOTHERLAND

Moscow KRASNAYA ZVEZDA in Russian 25 Dec 83 p 1

[Editorial: "Honor Is in One's Youth"]

[Text] The heroic history of our country and today's reality are rich with examples of youth bringing to a person national authority, the admiration of his contemporaries, and the respect of his elders. It is sufficient to recall that Nikolay Shchors commanded a regiment at 23 and a division at 24. Aleksandr Matrosov accomplished his undying deed at 19. Ivan Kozhedub at 25 had already been a Hero of the Soviet Union three times. None of them made allowances for their youth, and it became for them a time of glorious achievements and triumphs.

...Narrow bridges across precipices, a path through a ravine under threat of rockfalls, steep ascents and descents--such are the roads to Kandahar. Centuries-old, dangerous and difficult, this road has become many times more dangerous for people in recent years. To the difficulties fixed by nature itself, the d shmans have added minefields and bandit ambushes. But the enemies of democratic Afghanistan will not succeed in cutting this transportation artery, as they desire. As also with the other roads of the People's Republic of Afghanistan, columns of equipment move and pass along it.

Sr Lt A. Chernozhukov and his subordinates were accompanying 150 trucks loaded with medicines, food, and kerosene. The truck column arrived in Kandahar in its entirety, traversing hundreds of kilometers of the mountain serpentine without losses in men, equipment, or freight. And this is only one of many episodes from which the biography of this recent graduate of the higher military school and the biographies of his subordinates are taking shape. The services of Sr Lt Aleksandr Viktorovich Chernozhukov, who has repeatedly demonstrated his personal bravery, his boldness in command, and his mastery in the fulfillment of international duty as part of the limited contingent of Soviet forces in Afghanistan, have been noted with the Gold Star of a Hero of the Soviet Union.

Life always is written cleanly and at once: for every deed we answer with honor and dignity. The norms of military ethics and the laws of our Soviet morals have long been worked out and confirmed by the experience of many generations of Soviet people. Their experience says that recognition and glory come to those who from the first steps of their conscious life are persistent and clear of purpose, who give all of themselves in service to the Fatherland.

"The dearest thing to a man is life," wrote Nikolay Ostrovskiy. "It is given to him once, and he must live it so that his idly spent years are not agonizingly painful to him..." These textbook lines from the novel "Kak zakalyalas' stal'" [How the Steel Was Tempered] are known to each and every one of us. In them is comprehended the result of the struggle of a communist who has not left the battle, in them is the mandate for new generations of fighters for communist ideals.

And our youth is true to this mandate. Participation in the chief concerns of our country, responsibility for their resolution, readiness for great deeds and for heroic defense of the Motherland--all these qualities have been and remain inherent traits of the character of Soviet youth, including our young fighting men.

From the age of 18, a citizen of the USSR is subject to military service and begins fulfillment of his constitutional duty--with weapon in hand, he defends the safety of the socialist Fatherland and the peaceful labor of the Soviet people. In military service, as a rule, he becomes a Komsomol member, a sportsman, a holder of a certificate of completion of his secondary education.

The officer corps of the Soviet Armed Forces is also replenished annually. An overwhelming majority of this replenishment consists of youths who have barely crossed the threshold into their twenties. Thier high level of education and strong professional training is combined with communist conviction and ideological and moral training. While still within the walls of the military schools, many cadets are vouchsafed an honor of being accepted into the ranks of the Communist Party of the Soviet Union.

Soviet people look upon their defenders, the soldiers and their officers, with pride and hope. Today, in connection with the acute tension of the international situation and the increase of military danger, still more responsible tasks have been laid upon them. The chief of these is a tireless concern for the further strengthening of readiness to repel aggression, from wherever it may come. It is alert watchfulness, still more attention devoted to efforts in combat and political training, and a strengthening of military discipline.

The times dictate such requirements. And he who does not apprehend their commands invariably finds himself sidetracked from real life. "From the beginning of my service, everything went well for me, and I received my regular military rank at the proper time," Senior Lieutenant N. Kuznetsov reports in his letter to KRASNAYA ZVEZDA. "I had encouragements from my

commanders. But now I obtain no satisfaction from service because I have been transferred to another post. It's probably my own fault. I began to violate military discipline and to neglect things...." The officer excuses his weaknesses by citing family troubles. But these justifications are unconvincing. Nothing like this would have occurred if the officer had been more deeply aware of his personal responsibility for his conduct and for his affairs relating to the service.

Failure in life and in the service is never without consequences. Not for nothing does popular wisdom say: "Clothes can go to the riverbanks again, but honor is in one's youth." And if one has made mistakes in the service, one must be able to surmount them. It would be more fitting for the officer Kuznetsov to win back the right to his former post not with petitions, but with deeds, by the model execution of the duties of his present post. Such a path is, of course, more difficult, but only in such a way is it possible to restore confidence, to show that the correct conclusions have been drawn not only in words but also in deeds.

The defining dictionary thus explains the concept of honor--it is the internal moral quality of a man, his valor, integrity, nobility of spirit, and clear conscience. To this, let us add: the honor of a serviceman is tested by measure of his duty. With its exact and irreproachable execution is linked not only the personal but also the professional honor of the fighting man.

From the moment of taking the military oath, the personal honor and dignity of the serviceman is manifested first and foremost in how he executes the requirements of the oath, military regulations, and the orders and instructions of his commanders. To that extent to which he is imbued with conscious socialist discipline, and with that ardour in which he carries out his regular military obligations and resolves important service tasks, to a decisive degree will depend both the evaluation of his service, the attitude of his comrades, and the growth of his individual military competency. Concern for the combat readiness of his subunit, unit, or ship, and his personal contribution to its improvement--this is the most important indicator of a fighting man's maturity.

Work with the youths of the army and the navy, including the young officers, is a sector of special responsibility, to which the party devotes constant attention. In a meeting at the USSR Ministry of Defense with veterans of the Soviet Armed Forces, USSR Minister of Defense Marshal of the Soviet Union D.F. Ustinov said: "in working with the young, one should not be sparing with good words and fatherly help. We must be more generous in sharing our experience." Who better than a veteran, whose party, army, or navy career amounts to tens of years, to help in the military training of young soldiers and sailors, to strengthen their communist convictions and their readiness to come out in defense of the socialist Fatherland with weapons in hand at any moment with the experience of his own life. Who, if not the veteran, by telling about his hard but beautiful fighting youth and generously sharing his experience and wisdom, can point out to

young fighting men the true path to military competence, can convince them of the vital necessity of strict, regulation order and iron military discipline. It is precisely the experience of veterans, of those senior in service, that will help the young to quickly take their places in formation, in the life of the military collective.

The professional growth and maturing of young officers must be a subject of particular concern. On the effectiveness of work with the young officers and on the quality of their training to a great extent depend the present and the future of the Armed Forces. Commanders and political workers are called upon to vary the forms and methods of this work, to raise it to the level of the party's requirements, in particular to more broadly make use of the strength of the influence of veterans, if possible to invite them to units and aboard ships on the days of celebration of significant dates, to hold meetings and talks with them prior to the execution of important combat-training assignments. Vivid stories of the deeds of heroes invariably give rise to the aspiration to equal the glorious deeds of fathers and grandfathers, to direct one's youthful strength, knowledge, and skills to the worthy execution of military duty.

Service in the army and the navy gives every young man the chance to demonstrate his best qualities, to test himself in difficult and at times really severe conditions. And honor comes from service and personal merit. Hundreds of thousands of Soviet fighting men are honored with decorations for their high marks in combat and political training, and for courage in the performance of their military duty. For example, Senior Lieutenant V. Kravchenko recently became a bearer of the Order of the Red Star, and Senior Sergeant A. Mirzakarimov was awarded the Medal for Valour. Like many of their comrades and contemporaries, they are not simply brave men--they are mature specialists in the military sense, although each of them is very young in years.

"The young are our successors," emphasized Comrade Yu. V. Andropov, general secretary of the CPSU Central Committee and chairman of the Presidium of the Supreme Soviet of the USSR, in his address to a meeting with party veterans at the CPSU Central Committee. "Time is working for the young. And it should be so. It is important only to be sure that we are being succeeded by people who will not forego the banner of October and the ideas of Lenin in anything, and who know their business well and thoroughly." Our Soviet Armed Forces are training such successors to the tested veterans of our army and navy.

Youth is man's great wealth. And it is important to make use of this wealth skillfully, to give it in service to the socialist Fatherland, to the great cause of communism.

12462
CSO: 1801/216

KRASNAYA ZVEZDA PUBLISHED LEGAL INFORMATION FOR SERVICEMEN

Moscoq KRASNAYA ZVEZDA in Russian 7 Jan 84 p 2

[Text] In the Interests of the Health of Our Fighting Men

The order of work for extraordinary anti-epidemic commissions of units and ships has been determined. Such commissions are appointed on the orders of the corresponding commanders to strengthen checking for fulfillment of the requirements of sanitary-hygienic norms and rules in the organization of the material safeguarding of the troops, and also to take active steps toward the elimination of known violations that promote the origination and dissemination of infectious diseases. To the commission are appointed representatives of headquarters and of the rear services; the deputy commander of the unit or ship must be its chairman.

In its activity, the commission is guided by legislative acts on questions of public health care, by general military regulations; and by other documents on questions of preserving the health of personnel. The commission has the right to prohibit, or to suspend prior to elimination, violations of the corresponding rules for the operation of feeding, trade, and water supply projects; communal housing; culturally-oriented buildings; and also certain other projects and individual types of equipment in the event of their unsatisfactory sanitary condition. The commission also has the right to petition for punishment of persons responsible for admitted violations of the sanitary-hygienic norms and rules.

For the Regulation of the Distribution and Acquisition of Combustible Lubricants

The Presidium of the Supreme Soviet of the USSR has established administrative responsibility for the unlawful distribution and acquisition of combustible lubricants belonging to state or public enterprises, institutions and organizations. In the absence in these operations of signs of misappropriation, they entail a fine in the amount of from 20 to 100 rubles, imposed by the chief of the organ of internal affairs of his deputy.

12462
CSO: 1801/216

DIARY OF A GUARDS COMPANY COMMANDER

Moscow KRASNAYA ZVEZDA in Russian 8 Dec 83 p 2

[Article by Guards Captain A. Zhuravlev, commander of an airborne company, entitled "And Lead into Battle"]

> [Text] Company commander... It is difficult to overestimate the role of this category of officer in the indoctrination and education of soldiers. First among the multiplicity of a company commander's duties is organizing military and political training. Or, in other words, teaching personnel what is necessary in war. Concern for realizing this principle and for the quality of military training has permeated the pages of Guards Captain A. Zhuravlev's diary. The captain has been awarded the order "For Service to the Motherland in the Armed Forces of the USSR" 3rd Degree.
>
> Today we are publishing excerpts from this airborne officer's diary and his commentary on them which in our opinion is of interest to the readers.

"A battle in the mountains has its own rules. I have heard these words many times and only now has my own experience convinced me of their truth. The first military activity in mountainous terrain sharply illuminated both the positive and negative aspects of training airborne troops. It turns out that for all that, we insufficiently teach soldiers what is necessary in modern battle. It is necessary to quickly correct..."

A long time has passed since the episode which preceded my writing those lines in my notebook and I remember it to this day. I had just been assigned as a company commander then. Upon taking over the company, there was barely enough time to get acquainted with the personnel. Mountain tactical training with combat firing soon began. The environment was as close to combat conditions as possible. At one of the final stages of training our company received the order to complete a swift march in an alpine area and attack the "enemy" who had secured the commanding heights.

The company hurriedly came out on the designated line exactly on time. The "enemy" noticed us and opened up with aimed machine-gun fire. Having

evaluated the situation, I decided to send the platoons commanded by Guards Senior Lieutenants A. Popov and V. Ponomarev to flank the "enemy's" strong point.

It seemed that we were already near victory. But suddenly the right-flank platoon, commanded by Guards Senior Lieutenant Ponomarev sharply lowered the tempo of the attack and dropped flat. Communications with them were lost for some time. The company's military order was disrupted. At that critical moment the left-flank platoon commanded by Guards Senior Lieutenant Popov saved us as its personnel had secretly moved around to the "enemy's" rear.

The results of that training forced me, yes and all the officers, to think seriously. What let us down in the mountains? Was it the equipment? No. It was equal to the occasion and during training there was not a single failure. Perhaps I made the wrong tactical decision? I can't say that as during the critique it was acknowledged correct, based on the situation created in the dynamics of battle. Then what was it? No matter how painful it is to recognize, what were not equal to the occasion were the field training, moral-psychological and physical tempering of the airborne troops.

Thus, Guards Senior Lieutenant Ponomarev lost his head in the circumstances that occurred. Although he was no coward and had made more than 50 parachute jumps, in the mountains he failed and showed indecisiveness. And whom do soldiers in battle look to if not their commander, and who but he sets the example?

We began to correct the situation by improving the quality of exercises and we took the tack of increasing the platoon leaders' responsibility for training their men. Every evening we began to gather to discuss methods for working out this or that training question and discussing the organization of competition according to missions and norms. Marksmanship training was always conducted against a tactical backdrop and simulators were used during firing. To increase the load on the airborne soldiers, the rucksack weights were increased and all movement in the mountain training center was done only at the double-time. In short, we tried to make the surroundings in exercises as close to combat conditions as possible.

This was certainly not easy. Such loads seemed beyond the power of even several sportsmen. For example, Private A. Kuryayev, a candidate for master of sports in free-style wrestling, drooped after several intensive exercises in the training center. He came to me with a request for a transfer anywhere where the load was lighter. I naturally refused and I spoke with platoon leader Guards Lieutenant S. Khozeyev and Guards Sergeant A. Treskovskiy so that they would take the physical training of the airborne soldier under control and help him as necessary. Soon Private Kuryayev was the equal of the company's hardiest soldier. Certainly I was happy for him as I was for all the airborne soldiers who reached manhood literally under my eyes with every passing day.

"Tomorrow is firing for record. We had no luck with the weather. Since yesterday rain had been charging, and rain was a rare "guest" in this tempered hot land. How will the troopers act? Will the firing go successfully? These thoughts wouldn't leave my head...

This foul day clearly comes to mind. It had to happen like that. It had not rained for almost eighteen months and here it poured as if from a bucket. In the morning the company arrived at the alpine range. The people stood silently in front of the tower and looked into the depths of the target area. Because of the solid wall of rain the eroded silhouettes of the targets on the sloops of the heights were difficult to discern.

After completing the safety instructions for firing, I again reviewed the formation and involuntarily thought about the fact that certainly in these weather conditions the soldiers' battle training would show up as it really was in the given event, tactical marksmanship training. As they say, you can't order the weather for a battle.

The first to the firing line were Guards Senior Lieutenants V. Fomenko and A. Tereshchenko. The command "To battle!" rang out and the officers, taking their automatics out on the move, hurried to the entrenchments. Soon the first targets appeared, a group of "enemy" infantry behind a rock. Short bursts rang out and a red thread of tracers made for the targets. On the command the officers rushed to the attack. Soon their figures were hidden behind rain shrouds. It was possible to determine the tempo of their attack only by the short bursts and the toneless grenade explosions.

The officers returned to the departure line excited and roused. Both evaluations were "excellent"! And they had completed the exercise with less rounds than expected. You had to see how this lifted the mood of all those present. The airborne soldiers were revitalized and the face of the senior chief observing the firing got warm.

And then one after another soldiers and sergeants went to the attack and as a rule showed high results. The young soldiers Guards Privates A. Kuryayev, T. Utbasarov and others distinguished themselves. The common evaluation was "excellent".

The firing said much. And most of all that the platoon leaders had developed in themselves and in their subordinates the readiness to act in any situation and the ability to conduct fire in the most difficult conditions.

"The officers cadre play a prime role in the formation of Soviet soldiers and in guaranteeing the constant military preparedness of the Soviet Armed Forces... Their profession is responsible and honorable. The Motherland entrusts to them the dearest of its property, our excellent youth, whom they must train in military affairs, educate and when required, lead into battle."

I wrote these words into the diary from USSR Minister of Defense Marshal of the Soviet Union D. F. Ustinov's speech "Sixty years guarding the conquests

of Great October". They ring out with such urgency for officers today. We know how much effort the Communist Party and the Soviet Government apply in the foreign policy arena to stopping the arms race, to parrying the threat of war and to providing our people with peaceful conditions to build socialism and communism. But we, military people, know the other side of the coin, that the situation now in this planet is heated to the limit, that the forces of reaction and militarism headed by U. S. imperialists, carrying out their aggressive plans, are prepared to enter any adventure, right up to unleashing the fire of nuclear war. And this is why in these conditions there is a special demand on us, officers, for the safety of the Motherland and the fate of peace on earth. Indeed the direct training for soldiers in the science of defending the Motherland is conducted in companies and platoons. We have been entrusted with people and we are to train and educate them.

But most of all, I consider that we must strictly ask from ourselves, must work as service and party responsibility dictates. Communist Guards Captain I. Monakhov will always be the example for me of such an approach to indoctrinating personnel. This officer went from success to success. For several years the airborne company he commanded was excellent. It distinguished itself in the high tactical marksmanship training of its personnel and by their skillfull, decisive action in the most complicated situation, including in night battle. There was strong military discipline, organization and military cohesiveness in the company.

This was due primarily to the great service of the company commander. He was the one who formed in his subordinates such qualities as decisiveness, resourcefulness and the ability not to lose their heads regardless of the circumstances. Guards Captain Monakhov was twice awarded the Order of the Red Star for successes in training and indoctrinating subordinates.

Communist Monakhov liberally shared his rich experience with his comrades and he helped me in many ways. In particular, I adopted much of the methodological ways of teaching soldiers the art of accurate fire and the organization of night combat from him.

Now Monakhov is already a major and commands a training battalion. As earlier, everything is successful.

Not long ago I was transferred to another garrison. I command another airborne company. We successfully went through an inspection and completely met all our competition commitments. We began the new training year in an organized manner.

We keep an unusual relic in our family, two jagged, darkened pieces of iron. They are splinters! My father, a veteran of the front, carried them in his body for more than 35 years. Several splinters have still not been extracted yet. Certainly we, his three sons, became officers and serve in airborne units under the influence of our father's tales of battles and charred remains, of battle heroes and high responsibility, defending the Motherland. My older

brother Grigoriy is a major and commands a battalion. My younger brother Vladimir is also a major and a battalion chief of staff. I like my brothers am proud of my military profession and I see my highest duty as teaching subordinates to reliably defend the Motherland. And if required, to bravely lead them into battle like our uncles and fathers did in the years of the Great Patriotic War.

12511
CSO: 1801/162

POOR CONDITION OF GARRISON TOWN CRITICIZED

Moscow KRASNAYA ZVEZDA in Russian 8 Dec 83 p 2

[Article by Colonel A. Drovosekov entitled "Behind the Pretty Facade"]

[Text] That night apparently something in nature was not working and the yellow lantern of the moon wasn't shining at the designated time. The living area in the small military town, blanketed with darkness, hid many dangers for passers-by. Not knowing the local terrain and also the various types of artificial barriers, one could receive bodily harm. One had to grope his way along because there were a total of four street lights within sight, and moreover these didn't shine, but dimly flickered.

The next morning a rather dismal picture greeted the eyes. The irrigation system in the town had been neglected to the verge of breakdown, the street and sidewalk were composed of ruts and bumps with a trace of asphalt, and there was all kinds of rubbish scattered on the children's playground. Along the recently opened new homes, instead of a well-organized area, there was a pile of reinforced concrete slabs and the remains of a brick wall from a temporary structure. Some fellow had efficiently gathered all this and had accurately, brick by brick, piled it in the trunk of a "Zhiguli". Very likely he had decided to build a garage, because here only those whom laziness has overcome do not build them. The rest erect garages anywhere and anyhow. Even on the children's playground. And several amateur gardeners had taken many liberties. A small spot takes a man's fancy, say, between buildings and he hammers in four stakes, stretches barbed wire, and there is his plantation. And the fact that it hinders a passageway and thoroughfare doesn't bother the gardiner.

It looks like the condition of the living fund also bothers few people. Several houses require immediate repair, in many doorways the doors are broken or are torn from their hinges, there is litter on stair passages, and there is abstract art on walls. In a word, the desolation raises the puzzling question. How could such a thing happen? Indeed I remember this town entirely differently. It was always festive with its smart, tended look, with its own micro-climate. Coolness was felt here on even the warmest days. And instead of becoming more beautiful and better organized with passing time, as one ought to expect, it lost even what it had had.

"It's nothing surprising," said the building manager T. Eizenshtein. "For several years nothing has been done about the amenities. The garrison KECh [inspection maintenance unit] has not expected to help as it lacks even the most necessary things like lamps and first aid fittings.

"And how do you explain the willful construction and laying out of the city as it took people's fancy?"

"Probably by connivance. No one listens to us, the building administration workers, and our garrison commanders have not done anything."

I decide to see the commanders. I begin with the garrison KECh chief, Major of engineers H. Propadalin. My first question to him is about garages.

"Certainly it is an outrage that every person builds where he takes it into his head," summarized Nikolay Ivanovich. "But it is difficult to correct this problem now. The gin had spilled out of the bottle long ago, and I just took over the position of KECh chief a few months ago. We will resolve the issue of land plots under garages."

It is not necessary to recall the further course of conversation here. Comrade Propadalin answered my questions about the time frame for beginning work on organizing rather vaguely, as nothing remained to be done since the deputy garrison chief for rear area issues Lieutenant Colonel V. Sergeyenko was visiting.

Viktor Andreyevich did not deny the obvious facts. He agreed that the living area of the town had been neglected, that garages mar the view and their illegal construction had not been stopped with the necessary decisiveness. In general it was necessary to bring order.

"Thus this issue has become the absence of what?"

"The absence of material for organizing and land plots for garages."

Comrade Sergeyenko could not give me an answer as to how quickly they could resolve these problems. Neither could the garrison chief. According to him, he had gone to the chief of TurkVO [Turkmen Military District] KECh with a request for help in repairing the roads and night lighting and to force the garrison KECh to specifically take part in this work, but the district KECh had as yet taken no real measures.

By order of the garrison chief, Lieutenant Colonel of Engineers V. Rybin was appointed senior officer of the military town. I did not ask him the stereotypical questions I had given the responsible people in the garrison. And it was obvious that his capabilities were very limited.

I left the military town which was once the first stage of my officer career with a heavy feeling. It is insignificant against the backdrop of modern

training buildings and barracks for personnel, structures of various designations which make up a single, smartly planned and durably built complex, invariably receiving the high evaluation of specialists and senior chiefs arriving in the garrison. It is only a shame that they likewise do not drop in where officer and warrant officer families live.

And indeed it is worth dropping in. Then, one must think, not only those quilty of the neglect will be found, but the necessary forces and material for bringing the proper look to the living area will also be found. It is certainly time to stop hiding the unattractiveness of the rear area behind the pretty facade of a military town.

12511
CSO: 1801/162

TORPEDO-RECOVERY TRAINING EXERCISE DESCRIBED

Moscow KRASNAYA ZVEZDA in Russian 19 Jan 84 p 1

[Article by Capt 2nd Rank A. Kolesnikov, unit staff officer: "The Torpedo Retrievers: A Report"]

[Text] The weather is freshening a little, the sea is darkening, and Warrant Officer [Michman] V. Antsiferov is getting more worried. The little torpedo recovery boat greets each wave more and more diligently and deferentially. But the basis of the experienced sailor's concern lies not in this--he can take the launch back to the base in any situation, but how is he going to find the torpedo.

The fact is that somewhere beneath us, a desperate battle had become imminent at this time. Two submarines had come together in one sector in order to best each other in a duel. The submarine commanders had interested themselves in only one thing: the slightest hint of the noise of "enemy" propellers. Whoever managed to launch his torpedo first would also wait with acute tension for its impact on the target. But in the end, the torpedo had to be resting on the deck of our torpedo recovery boat. Otherwise you could not call the practice battle successful to the end, regardless of the results: a practice torpedo is an expensive thing, and to lose one is impermissible.

But the submariners can rest easy both before and after firing. Because Michman Antsiferov is looking after them; in this business, he is a master among masters.

A wave rocks us, the time scarcely crawls along, uncertainty makes us more alert. In such circumstances, the sailors, in order to avoid an impermissible "demagnetizing", try to conduct themselves calmly.

The commander of the torpedo recovery boat has begun to peer attentively into the frothy distance. Under the salt spray, his face seems younger. Vladimir Ivanovich has intuitively sensed that their moment has come.

"Report the situation every minute," the warrant officer ordered the radiometrist, Sr Smn V. Skripnik, in low tones. Trying to gauge the level of the crew's intentness upon the search, he then turned to the helmsman on duty, Smn V. Marachkovskiy.

"Bear more to port, and keep a better lookout."

Everyone who stood with the commander of the launch and heard these words understood that his confidence in their success was not based on guesswork alone. But no matter how much they peered into the gloom, it was all for naught. Had Vladimir Ivanovich been joking when reassuring the crew of a quick success? Not that such is the custom with him. He has commanded this launch for many years. And the unit cannot recall an instance in which fortune has betrayed Michman Antsiferov.

But is it fortune alone here? The big thing, naturally, is accumulated experience. In foul weather, there is intuition--the most reliable compass. However, in relying on flair, one must not forget the need to study and to learn. Although the launch is not new, it is equipped with modern instruments. Mastering them to perfection is not an easy task. But the commander here has managed it. He is also a skillful and capable navigator, he understands the business of mechanics, and he is the best helmsman and radiometrist in the crew.

Among the whitecaps, scarcely noticeable, gleamed the blunt head of the torpedo. The underwater duel of the two ships had come to an end. And it occurred to me how necessary it is to possess a broad imagination in order to bring the launch to the point at which the torpedo had surfaced without error, employing only circumstantial data.

"Is the slip-knot ready?" asked Antsiferov, although he knew that all his subordinates were prepared and everything had been done in time.

But the retrieval of a torpedo has its peculiar ritual, in which the forgetting of even one element is inadmissible. In this lies respect for one's labor.

Smn. V. Buyanov was supposed to lasso the torpedo. It is best to do this right the first time. And not just to save time. At sea it can happen that if you miss the first time, a second opportunity will not present itself.

Balancing on the edge of the deck, Buyanov, not hurrying, even a little lazily, chose his moment. And suddenly the bright-orange patch of his safety vest almost threw itself into a gathering wave. The safety line quivered like a string, and Buyanov's hands jerked back abruptly. Done! The torpedo, like a capricious ribbon, pulled at the side, but could no longer break away.

Michman Antisiferov did not even turn his head. And for Buyanov, this was not lack of attention, but great confidence--the praise most valued by the sailor.

The crew very much valued its commander's praise, knowing what respect Vladimir Ivanovich enjoyed among the commanders of larger ships and the flagship specialists. Yes, he has a small post, but one necessary to everyone in the fleet. And, one must say, one that requires particular talent. Vladimir Ivanovich has two such talents: as a retriever of torpedoes and as an educator. From his easy hand, and following his example, Warrant Officer V. Stoyko, A. Shelgunov, and others who have passed through Antsiferov's school of express service have become commanders of torpedo recovery boats. They command more modern launches. Vladimir Ivanovich himself does not want to part with his veteran launch, which as before is the model for everyone.

The narrow torpedo, not far from being unnaturally long, rests peacefully on a shelf. It was no easier to fish out than a wounded shark. In the freshening weather, it strove to hit someone or be hit itself. Both the one and the other are impermissible. For the time being, outwardly everything looks satisfactory: no dents or scratches. First aid from me is not required. As was ascertained later, everything was also in good order inside. And this means that an expensive torpedo can be used again in a practice attack.

12462
CSO: 1801/216

FOREIGN MILITARY AFFAIRS

TABLE OF CONTENTS: ZARUBEZHNOYE VOYENNOYE OBOZRENIYE NO 12, DECEMBER 1983

Moscow ZARUBEZHNOYE VOYENNOYE OBOZRENIYE in Russian No 12, Dec 83 (signed to press 15 Dec 83) pp 1-2

[Full-text translated articles published in this JPRS report are indicated with an asterisk (*)]

[Text] Contents Page

Articles by Soviet authors and the chronicle were prepared from materials of the foreign press. This issue used illustrations from the reference works "Jane's" and "Aircraft of the Republic of South Africa" and from the journals: AVIATION WEEK AND SPACE TECHNOLOGY, AERO, WEHRTECHNIK, DEFENSE ATTACHE, DEFENCE AND ARMAMENT, INTERNATIONAL AIR LETTER, INTERNATIONAL DEFENSE REVIEW, NAVY AVIATION NEWS, NAVY INTERNATIONAL, TECHNOLOGIE MILITAIRE, FLIGHT, SOEFART, AIRMAN and AIR ET COSMOS.

6904
CSO: 1801/175

U.S. ARMY'S TREATMENT OF OPERATIONAL ART IN DOCTRINE DISCUSSED

Moscow ZARUBEZHNOYE VOYENNOYE OBOZRENIYE in Russian No 12, Dec 83 (signed to press 15 Dec 83) pp 3-7

[Article by Lt Col G. Vasil'yev: "Questions of Operational Art in the U.S. Armed Forces"; passages rendered in all capital letters printed in boldface in source]

[Text] In striving for world domination and diktat in international relations, the U.S. military-political leadership has openly set a course toward inciting militaristic hysteria and at working up the unprecedented arms race. By its present actions the Reagan administration is pursuing the chief objective of achieving military superiority over the Soviet Union, with broad-scale, aggressive preparations being cloaked hypocritically by verbiage about the allegedly "defensive" nature of the measures being taken.

In fact, as the foreign press attests, the Pentagon is vigorously implementing a program for building up strategic offensive arms through the modernization of existing systems of intercontinental ballistic missiles, strategic bombers and nuclear-powered strategic submarines and the creation of new systems. The deployment of American medium-range missiles began in late 1983 on the territories of the FRG, Great Britain and Italy. This step undertaken by U.S. and NATO militarists is aimed at achieving military superiority over the USSR and Warsaw Pact states and at considerably improving U.S. capabilities to deliver a first nuclear strike.

The American command has taken in recent years and is taking a number of major steps to strengthen the general-purpose forces. In particular, their arsenal of nuclear and chemical means of mass destruction planned for use directly in the zone of combat actions is being augmented, the inventory of tactical and army aviation is being renewed, troop antitank capabilities are improving and air defense weapons are being modernized. Special attention is being given to the creation of reconnaissance-attack systems, precision guided weapons, and cluster ammunition with homing elements for destroying mobile group targets and fixed objects scattered over considerable areas and at long distances. A reorganization is under way of the units [chast' and soyedineniye] and formations [ob"yedineniye] and it is planned to set up a number of new, highly mobile divisions resulting in increased troop capabilities to conduct lengthy combat actions in various TVD's [theaters of military operations] using conventional or mass destruction weapons.

The qualitative improvement of weaponry and the T/O&E structure of units is accompanied by a search for the most optimal methods of using their growing tactical capabilities. This is reflected in a revision of American regulations and manuals. A graphic example of this is the adoption in late 1982 of the fundamental U.S. Army field manual FM 100-5, entitled "Operations," and the appearance in the foreign press of a series of articles discussing a new approach both to general issues of military art and to individual problems in preparing, conducting and providing comprehensive support to combat actions of American ground forces and other branches of the Armed Forces. In particular, a qualitatively new point is the division of military art into three parts (and not two as earlier): strategy, operational art and tactics, each of which represents a vast sphere of military activity.

As the American press emphasizes, MILITARY STRATEGY elaborates and determines the principles for preparing and conducting unified, joint and independent operations of branches of the Armed Forces and war as a whole. According to the concept of the U.S. military-political leadership, armed forces must be used to achieve objectives of the politics of ruling classes through the use of force or the threat of force.

OPERATIONAL ART (officially examined for the first time by American specialists) represents the theory and practice of preparing and conducting operations by major formations [soyedineniye and ob"yedineniye] and provides for the planning and conduct of campaigns in a TVD and a theater of war. It encompasses questions of employing all resources at the disposal of the command element for accomplishing strategic missions by the simultaneous or successive defeat of enemy troops in a certain spatial sphere by given times.

TACTICS includes specific operating procedures and methods used by subunits and units [chast' and soyedineniye] to achieve assigned missions. Questions of logistical support also are examined here. In the opinion of American specialists, combat actions by the corps and division are based on identical principles and so it is impossible to delineate operational and tactical concepts precisely.

A typical feature of the views of any command element (at the strategic, operational or tactical level) in preparing and conducting war is the desire to prepare its forces for highly maneuverable, strenuous and primarily offensive combat actions against a technically well-outfitted enemy who is superior in strength in any TVD, and against well-armed rebel forces. The ground forces are viewed as the basic branch of the armed forces capable, together with the air force and, in maritime sectors, with the naval forces, of waging active, protracted combat actions day or night using various means of destruction, including nuclear weapons. They will be faced with decisive objectives: defeat of the opposing enemy, capture of his territory and attainment of a swift victory under conditions favoring the United States.

As emphasized by foreign specialists, the nature of modern military actions and the global nature of American imperialism's aspirations require as a mandatory condition the employment of ground forces in close coordination with tactical aviation, the Marines and the Navy.

The foreign press notes that an important element of operational art is the concept of an "air-ground operation (engagement)," which reflects qualitatively new views of the American command on the content and nature of future combat actions with consideration of the U.S. Army's technical reoutfitting during the 1980's with promising models of weapons and military equipment. Operational levels (the conduct of operations by large units [soyedineniye]) and tactical levels of combat actions are distinguished in conformity with the basic provisions of that concept and there is an increase in the role of components of combat power which do not lend themselves to a quantitative appraisal, such as maneuver, which concedes nothing to firepower in its effectiveness and importance.

The "air-ground operation (engagement)" is defined as a method for tactical employment of units [soyedineniye] and formations [ob"yedineniye] of the ground and air forces with close interworking. It is planned to attain the objectives of the operation by accomplishing operational maneuvers and conducting a series of interrelated operations (or actions) and engagements. It is believed that such operations will be most typical of the initial period of war in a TVD where deeply echeloned enemy tank and mechanized groupings already have been deployed. The essence of the "air-ground operation (engagement)" reduces to maneuverable combat actions of ground forces, airborne assault forces and air forces planned precisely by place, time, forces and means and conducted in concert with the use of various kinds of weapons, combat equipment and REB [electronic warfare] capabilities for the purpose of defeating the opposing enemy to the entire depth of his operational alignment. Realization of these provisions presumes the strictly coordinated employment of all components of combat might, from psychological operations to the delivery of nuclear strikes, with an extension of the sphere of combat actions to every terrain area and any enemy unit or formation which may significantly affect the outcome of the operation or engagement.

The United States presently is conducting development and comprehensive research of methods of coordinated employment of all-arms forces and means of the ground and air forces in the so-called "Air-Ground Operation (Engagement)-2000," which represents a further development of the American command's views on the employment of different branches of the armed forces and combat arms in joint operations. Its fundamental principles are initiative, depth, speed and coordination of operations.

INITIATIVE lies in anticipating the enemy, imposing on him the conditions for conducting an action or operation, using all available means and opportunities for delivering swift strikes from unexpected directions, and constantly striving to change the correlation of forces and weapons in one's own favor. According to American specialists' views, the resourcefulness, initiative, resolve and justified risk of commanders at middle and lower levels along with the troops' capability to wage independent combat actions in isolation from the main body acquire particular importance in a future war, distinguished by high maneuverability, the fast-moving and nodal nature of combat actions, rapid and abrupt changes in the tactical situation, and frequent instances of a loss of control and disruption of communications.

DEPTH of an "air-ground operation (engagement)" is characterized by spatial and time indicators and by the forces and means being used. It follows from provisions of the U.S. Army manuals that the area of upcoming action must be divided into two interrelated zones.

The tactical effect zone is the strip of terrain extending from the forward edge for a certain depth toward the enemy (depending on the command echelon level). Within this zone it is planned to conduct reconnaissance and bring immediate fire pressure on the enemy with all forces and means at the disposal of the given command element. It is assumed that the enemy located here will be one capable of substantially influencing combat actions of units [soyedineniye and chast'] and subunits. The depth of such zones may be 15 km for the brigade, 70 km for the division, 150 km for the army corps and more than 150 km for the ground forces command in the TVD (or for an army group).

The zone of potential threat is the terrain area beyond the tactical effect zone. Within it is an enemy capable of significantly influencing subsequent combat actions of the corresponding command echelon. The zone may have an arbitrary configuration and cover areas (sectors) of actions by adjacent formations or units. The depth of such a zone may be 70 km for brigades, 150 km for the division, 300 km for the army corps and over 300 km for the ground forces command in the TVD (or army group).

SWIFTNESS OF ACTIONS envisages flexibility of troop organization and of the tactical make-up of groupings as applicable to a specific mission, and the efficiency of thinking by commanders in chief or commanders at all levels. Swiftness of actions lies in the commanders' ability to anticipate decisive moments in combat, react swiftly to situation changes, anticipate the enemy in actions and undertake appropriate responses to avoid his superior forces with a simultaneous delivery of strikes against vulnerable spots; in performing a prompt maneuver for the purpose of concentrating fire and available forces and means against the enemy's weak spots; and in a more advanced art (tactics) of operations which supplement the effectiveness of weapon systems and military equipment. Special importance also is attached to good organization of reconnaissance, flexible planning and skilled choice of troop operating methods depending on the situation at hand.

COORDINATION OF ACTIONS presumes the full unification and subordination of efforts of the units of different combat arms and branches of the armed forces to a commander's (commander in chief's) single concept in the interests of successful accomplishment of assigned combat missions. The application of this principle during an "air-ground operation (engagement)" will allow the most effective use of tactical capabilities of the troops as a whole and of each unit individually, in the opinion of western specialists.

An important role is set aside in the "air-ground operation (engagement)" for fire (nuclear) pressure to the entire depth of the opposing enemy's combat formations (operational alignment) through the simultaneous destruction of his first echelon with organic or attached weapons and delivery of strikes against second echelons, primarily with tactical aviation. Strikes are planned in the

depth to delay, disorganize or isolate enemy forces and means not engaged, for the purpose of their subsequent defeat.

Therefore, while primary troop efforts at the operational level were focused in the previous period on defeating the enemy in direct opposition, at the present time, as the American command believes, their missions have increased considerably in depth and there has been a substantial increase in the need for coordination with tactical aviation in all phases.

The foreign military press has been giving much attention of late to an examination of basic kinds of combat actions (offensive and defensive) of American troops with consideration of provisions of the "air-ground operation (engagement)" being elaborated.

It is planned to conduct the OFFENSIVE at a high tempo (in some instances 50 km or more per day) and with a decisive objective of assuring the opposing enemy's total defeat or forcing him to surrender on terms favorable to oneself. Secondary missions include the capture of key objectives (terrain sectors), pinning down the enemy at the lines or positions he occupies, leading him astray with respect to actual plans, and so on. An offensive with limited objectives and reconnaissance in force will be conducted considerably less often than in the past and will be a supplement to the operation of electronic reconnaissance systems for collecting data on the enemy.

A defeat in depth during offensive actions initially is achieved by the isolation, reduction in mobility and weakening of the defending enemy to the entire depth of his operational alignment. Subsequently it will be directed at maintaining high rates of advance by preventing a regrouping of enemy forces and means for restoring the integrity of his defense and preventing the approach of reserves from the depth.

As stated in foreign military publications, the following are basic principles of offensive actions:

--Surprise which precludes a stereotyped approach to organizing and conducting an offensive and which provides for delivering strikes against the enemy where he least expects them and at a time unfavorable to him;

--Concentration of forces and means, especially at the "division-army corps" level, on selected axes (the primary role here is given to close coordination of units and formations of various combat arms and branches of the armed forces, to mobility, speed, concealment and deception of the enemy);

--Swiftness contributing to the attainment of surprise, constraint of the enemy, a reduction in the effectiveness of his countermeasures, and to maintaining high rates of advance and consolidation of success;

--Flexibility, consisting of thorough long-range planning and choice of different versions of combat actions as applied to the situation at hand;

--Decisiveness which envisages a constant struggle to seize and hold the initiative, the conduct of operations to the entire depth of the enemy combat formations (or operational alignment), and maximum use of available tactical capabilities in precisely coordinated combined-arms actions.

The DEFENSE is described as a forced kind of combat actions which are planned to be prepared and conducted to disrupt and disorganize an enemy attack, inflict the maximum possible damage, retake the initiative and create favorable conditions for a subsequent move into the attack.

According to the views of American military specialists, the defense can be divided into a mobile or static defense. The choice will be determined based on the combat mission received, composition and nature of actions of the opposing enemy, capabilities of one's own forces and means, terrain conditions and the availability of time.

The MOBILE DEFENSE is a dynamic kind of combat action which provides for executing a decisive maneuver in combination with fire, and immediate opposition with the enemy. The chief method of organizing and conducting such a defense is the maneuver for the purpose of disrupting combat formations of attacking enemy troops and destroying his main body.

The STATIC DEFENSE, which can be conducted in the interests of holding important areas or terrain sectors, is based on maximum use of all available weapons in combination with maneuver. It has considerably less flexibility.

It is believed that purely defensive operating methods will be inherent only to the tactical echelon. The defensive actions of large units may combine elements both of static defense (halting the enemy or forcing him to attack along specific axes) and of a mobile defense (executing a maneuver and delivering strikes against the enemy's vulnerable spots). Regardless of the methods chosen for conducting it, the foreign press notes that a defense presumes active maneuverable actions, defeat in depth, seizure of the initiative, delivery of counterblows or counterattacks and the transition to a resolute offensive.

American military specialists include tactical aviation, field artillery, tactical nuclear weapons (if employed), airborne units, and special-purpose subunits among the chief means for a defeat in depth. During defensive actions such a defeat will help prevent the enemy's concentration and creation of a superiority in forces and means on selected axes and a delay in the arrival of forces in his next echelon. The primary missions of fire pressure on the enemy in a defense will reduce to the following: splitting up and disorganizing the operational alignment or combat formations of his attacking troops; covering a maneuver by friendly units and formations; and reducing the effectiveness of enemy weapons, control and communications systems, and tactical and logistical support.

Judging from foreign press reports, the U.S. military-political leadership is revising views on the possible nature of modern combat actions and war as a whole in conformity with the qualitative reoutfitting of armed forces with promising systems of weapons and military equipment as well as the improvement in the T/O&E troop structure. The elaboration of principles of the "air-ground operation (engagement)" indicates a further development of theoretical views with consideration of the growing tactical capabilities of all-arms

forces and means, and of ground forces and tactical aviation above all, and signifies the American specialists' official recognition of the third component of the theory of military art, operational art (along with strategy and tactics).

Consequently the increased aggressiveness of imperialism, the Reagan administration's course toward an uncurbed race in nuclear missile weaponry and the course toward whipping up international tension reflect a number of new trends in military art as well. All versions of combat actions are created in the hope of winning war. "This activity," emphasized CPSU Central Committee General Secretary, Chairman of the USSR Supreme Soviet Presidium, Comrade Yu. V. Andropov, "is not simply irresponsible, but reckless." The American militarists should remember that no matter what weapons they invent and no matter what methods for unleashing and conducting an aggressive war they develop, they will not succeed in catching the Soviet Union unawares. The USSR Armed Forces together with the fraternal armies never will be defenseless in the face of any threat.

6904
CSO: 1801/175

U.S. MECHANIZED DIVISION'S DEFENSE OF WATER OBSTACLE

Moscow ZARUBEZHNOYE VOYENNOYE OBOZRENIYE in Russian No 12, Dec 83 (signed to press 15 Dec 83) pp 31-36

[Article by Maj I. Ostrovnoy]

[Excerpts] Having set a course toward the further aggravation of the international situation, the present Reagan administration noticeably stepped up militaristic preparations with the primary purpose of achieving military superiority over the Soviet Union. These are the very goals also served by the new military strategy, which in the United States was named the strategy of "direct confrontation" with the USSR. Guided by the strategy, the Pentagon is building up the might of the armed forces by outfitting troops with modern weapons and combat equipment, and it is conducting numerous exercises and maneuvers for working out problems of conducting combat actions in various TVD's [theaters of military operations].

The U.S. Ground Forces command believes that under present-day conditions decisive objectives can be attained in an action or operation only by the offensive. A situation may arise in the course of combat, however, where troops will be forced to conduct a defense under various terrain conditions, including on water obstacles. It is believed that a water obstacle in itself cannot halt an offensive inasmuch as the troops have modern assault crossing equipment which can be used to organize an assault crossing of the obstacle practically without any reduction in rates of advance. But the water obstacle can become a serious barrier if the necessary numbers of forces and means are concentrated on its lines and a set of appropriate engineer measures is carried out.

As the foreign military press notes, in the majority of NATO troop exercises conducted in Western Europe the forward and intermediate defensive lines as well as switch positions were set up at such obstacles most often with consideration of their hydrographic features. American manuals emphasize that when one shifts to defense of a water obstacle it is recommended that maximum use be made of the advantages the water obstacle creates as a natural barrier, that the minimum number of troops be used with the main body in reserve as a

counterattacking grouping, that various methods of river defense be employed, and that the reserves be disposed so that counterattacks can be carried out before the attackers are able to consolidate on the bridgehead and create a superiority in forces and means.

According to the views of foreign military specialists, defense of a water obstacle has the purpose of disrupting the enemy attack, holding important terrain sectors, forcing him to concentrate troops in the most vulnerable places, inflicting considerable losses on him and as a result creating favorable conditions for a subsequent move into the attack. The conduct of two kinds of defense--static (or area defense) and mobile--is envisaged depending on the specific situation and terrain conditions. The choice of a particular kind of defense depends on the mission assigned, availability of forces and means for the defenders, nature of enemy actions, presence of reserves with the higher command element, as well as hydrographic features of the water obstacle (its width above all), time of year and meteorological conditions.

The division may shift to a static defense in those cases where terrain on the defended bank does not favor troop maneuver, the defense area has little depth, division forces and means are limited, the enemy has greater mobility than the defenders and air superiority is on the attackers' side. Such a defense is organized and conducted to hold a specific area, it is based on maximum use of weapons and on engineer organization of the terrain, and it depends on the disposition of forces and means in the division's main defense area. The American command believes the organization of a static defense at water obstacles to have substantial deficiencies: a certain passiveness in troop actions in conducting the defense and the requirement for a relatively even distribution of forces and weapons in the defense. In addition, it does not allow full use of the modern division's increased maneuver capabilities and shock force as well as results of nuclear strikes delivered against attacking troops.

Mobile defense is deemed best where assigned missions and terrain allow combat actions to unfold to a great depth and favor the relatively free maneuver of division forces and means. With consideration of the possibility of the enemy making an assault crossing of the river across a broad front or on individual axes, it is planned to screen the friendly bank with small forces and means, with the main units and subunits (and armored units and subunits above all) in the second echelon or reserve in readiness for maneuvering to any threatened axis, which will be determined with the beginning of the enemy's river assault crossing. The best conditions are created during a mobile defense of a water obstacle for inflicting maximum losses on the attacking enemy using means of nuclear attack and air and artillery strikes on approaches to the water obstacle with a subsequent completion of the enemy's defeat on the opposite bank by conducting counterattacks.

American military specialists believe that in organizing all kinds of defense great attention must be given to the use of army aviation helicopters, which are viewed as one of the effective means for accomplishing various missions arising during combat, and chiefly for combating tanks and other enemy armored

targets, including in the depth of his combat formations (mechanized and armored divisions have army aviation battalions numbering 143 helicopters, of which 42 are the AH-1S Cobra TOW fire support helicopters).

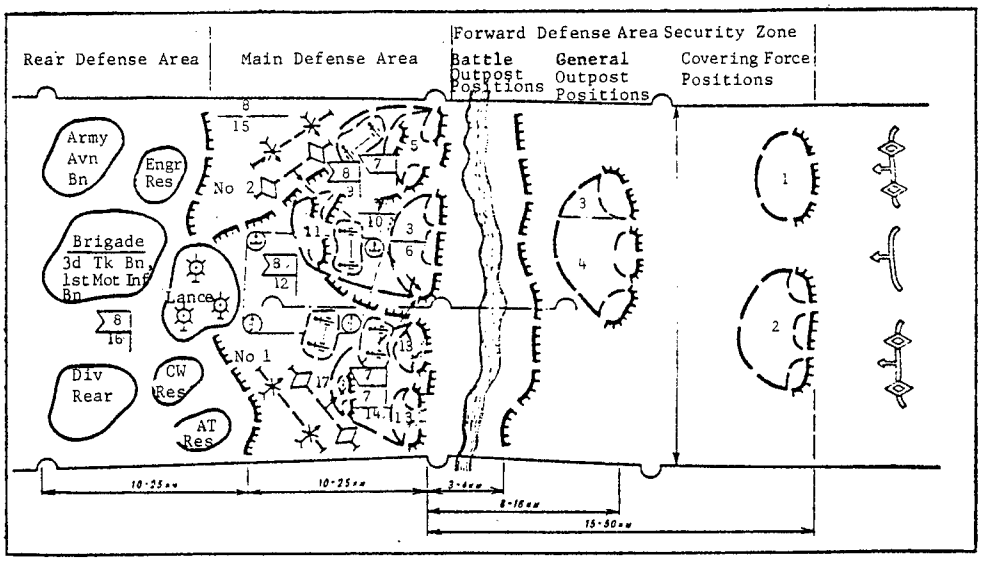
According to views of the Ground Forces command, the mechanized division's role in defense of a water obstacle is determined by its place in the army corps combat formation, the assigned combat mission, importance of the defended terrain area, and so on. As a rule, a division may operate as part of an army corps in its first or second echelon, and in some cases it may function independently.

As the foreign press reports, a division on the defense (both static and mobile) is assigned a zone of 40 km or more laterally and 20-50 km in depth. A brigade may receive a zone 10-20 km wide and 10-25 km deep. Motorized infantry battalions operating in the division first echelon may defend an area 3-5 km wide and up to 5 km deep. If the commander's concept provides for defeating the enemy in defensive sectors prepared in advance the battalions will occupy an area up to 8 km wide and will align the combat formation in a single echelon. In analyzing NATO exercises of past years in Western Europe, foreign military specialists note that when a mechanized division's defense was organized on a water obstacle it was assigned a zone of 30-50 km. In their opinion the width and depth of the division defensive zone under these conditions will depend above all on terrain conditions and features of the water obstacle, i.e., the more the terrain hinders enemy advance, the wider the defensive zone will be.

A forward defense area security zone and main and rear defense areas (see diagram) will be set up in organizing the division's defense of a water obstacle.

In the absence of immediate contact with the enemy the forward defense area security zone is set up on the opposite bank to a depth of 15-20 km. Positions of the screening troops, general outposts and battle outposts are organized within it. Judging from foreign press reports, the division may send out screening troops (a reconnaissance battalion which interworks with a reconnaissance battalion of a separate armored cavalry regiment from the army corps operating in the division defensive zone), general outposts consisting of a reinforced motorized infantry or tank battalion, and battle outposts from the division's first echelon brigades (up to a reinforced motorized infantry company).

The primary missions of the covering troops are the timely identification of the enemy troop grouping, determination of the probable axis of its advance (or axis of main attack), disorganization of the attacking enemy as he advances to the water obstacle, prevention of deployment of his assault crossing capabilities for the crossing, and so on. Engineer organization of the forward defense area security zone is carried out for this purpose and includes the preparation of delaying positions, individual strongpoints, and so on. It is planned to place minefields and other obstacles on axes of probable enemy attack.



Combat formation of U.S. mechanized division in a defense (variant)

KEY:
1. Reconnaissance battalion
2. Reconnaissance battalion of separate armored cavalry regiment
3. Armored group
4. Motorized infantry battalion less motorized infantry company with tank company and battery of 155-mm howitzers
5. Motorized infantry battalion
6. Motorized infantry battalion with tank company less motorized infantry company
7. Brigade
8. Mechanized division
9. Forward CP
10. 2d Motorized Infantry Battalion, 1st Tank Battalion
11. Tank battalion less tank company with motorized infantry company
12. CP
13. Motorized infantry battalion less motorized infantry company
14. 2d Motorized Infantry Battalion
15. 6th Motorized Infantry Battalion, 4th Tank Battalion
16. Rear services control point
17. 2d Motorized Infantry Company

The division's main defensive area 10-25 km deep is formed by battalions or battalion tactical groups of the brigades' first and second echelons. Within it are battalion defense areas in which the following are organized: company and platoon strongpoints adapted for perimeter defense, artillery firing positions, deployment lines for counterattacks, and a system of obstacles. Here

too is the division forward CP (at the location of one of the first echelon brigades operating on the axis of probable enemy attack) and the main command post (in the vicinity of the brigades' second echelons).

The forward edge of the main defensive area may run either at a certain distance from the water's edge or on the slopes of the bank (when the river's flood plain is broad). In either case, however, it is designated at that distance which permits fire cover of the friendly bank.

In this case, in the specialists' opinion, there is more effective destruction of the enemy at the moment of the assault crossing and when he emerges on the bank, where he will be delayed by fire, minefields and other obstacles.

It is believed that special attention must be given to engineer organization of the area. Minefields and engineer obstacles are placed with greatest density on possible axes of enemy operations for this purpose. The banks are scarped and mined, bridges and local crossing equipment are destroyed and available fords are placed in a condition unsuitable for crossing. All hydraulic works are prepared for detonation and floating obstacles are arranged on approaches to the water obstacle and on the river itself. During combat it is recommended that minefields be laid using remote mining capabilities. In order to disrupt an assault crossing which has begun, it is planned to destroy the constructed crossings, eliminate existing fords, inundate individual terrain sectors on likely axes of enemy attack, and so on, by releasing water from reservoirs.

The division rear defensive area is behind the main area and has a depth of 10-25 km. Organized within it are the primary and alternate positions of units and subunits of the second echelon and reserves, firing positions of Lance UR [guided missile] batteries and concentration areas of the tactical airborne (airmobile) assault force; and routes of advance and lines of deployment for counterattacks are designated there. The rear command post and division rear also are located here.

The mechanized division's combat formation in a mobile defense of a water obstacle and operating on the axis of main enemy attack usually includes first and second echelons, groupings of field and antiaircraft artillery, special reserves and reserves of weapons. Two brigades usually fight in the first echelon. The second echelon has a brigade, which usually has tank battalions. It is located in the depth of the division's defense by battalions in readiness to conduct counterattacks from designated lines, to occupy a defense at designated positions if necessary, or to replace first echelon units and subunits which have suffered heavy losses.

A feature of the alignment of the division's combat formation in a static defense is the assignment of a considerable portion of forces and means to its first echelon. Judging from foreign press reports, with a two-echelon alignment the first echelon of a division operating on the main axis may have up to eight battalions. If the division is organizing a defense on the secondary axis, however, its combat formation is aligned in a single echelon with the assignment of a reserve (a tank or motorized infantry battalion).

The field artillery grouping includes organic and attached weapons (2-3 battalions of 155-mm self-propelled howitzers and one battalion of 203.2-mm howitzers). It performs the missions of destroying the enemy by fire ahead of the water obstacle and in the depth, and it supports counterattacks by division reserves.

Screening of the division main body, division artillery and the division's main command post usually is accomplished by the Chaparral-Vulcan air defense battalion. A battalion of Improved Hawk ZRK [surface-to-air missile system] may be attached to the division at times.

The engineer reserve includes one or two companies of a combat engineer battalion.

The division's antitank reserve includes combat engineer subunits and a company of fire support helicopters.

The division's tactical airborne (airmobile) assault force (up to a motorized infantry battalion) is intended primarily for a drop or landing in the rear of the enemy grouping making an assault crossing of the water obstacle in order to defeat it during a counterattack by the division second echelons.

A brigade defending a water obstacle on the enemy's axis of main attack aligns its combat formation in two echelons. A stronger second echelon (reserve) is formed in a mobile defense than in a static defense. A single-echelon alignment of the combat formation also is provided when the brigade is operating on a secondary axis or on terrain which hinders a river assault crossing, with one or two tank companies in reserve.

American military specialists believe that in creating a defense of a water obstacle the division has to pay considerable attention to fire support for troop actions. A fire support plan is developed for this purpose in which the fire of organic and attached artillery is coordinated with troop actions to defeat the main enemy grouping which has wedged into a previously prepared area. Under conditions where nuclear weapons are employed, nuclear strikes comprise the basis of fire support, and artillery and air support is organized with consideration of them. In the opinion of the American command, massive nuclear strikes against the enemy when he is moving up to assault crossing sectors must be delivered by corps resources. During this period the division may deliver individual nuclear strikes, but it is recommended that the bulk of nuclear weapons assigned to it be used before a second echelon counterattack. The plan of fire using conventional weapons is organized to assure destruction of the enemy on distant approaches, with an increase in fire pressure as the enemy approaches the water obstacle. Fire must reach its highest intensity when the enemy is deploying and assaulting the water obstacle, and at the moment the division second echelon makes a counterattack.

In the absence of immediate contact with the enemy, defensive actions at a water obstacle are divided, according to foreign press reports, into combat in the forward defense area security zone, combat for the water obstacle, and

combat in the defensive depth on the friendly shore; and with immediate contact with the enemy, into combat for the water obstacle and combat in the defensive depth.

Screening troops fighting at their positions in the forward defense area security zone must delay the advancing enemy, inflict considerable losses on him and force his main body to deploy before arriving at the water obstacle. Active reconnaissance with all forces and means is accomplished at this period with the primary objective of uncovering the direction of actions by the main enemy groupings.

Security subunits fight by the method of delaying actions, gradually withdrawing from line to line. Combat actions of the general outposts are supported by the fire of artillery and mortar subunits and by tactical and army aviation. Positions of the battle outposts represent the last line of combat actions for subunits of the general outposts. Here the defenders offer maximum possible resistance to the enemy, and when the enemy approaches the water obstacle the defenders use crossing equipment to withdraw to designated areas in the division's defensive depth. The withdrawal is organized so as to bring the attacking troops under flanking fire of first echelon units. One of the most important missions of the defenders here is considered to be the disruption of enemy attempts to cross the water obstacle from the line of march following the withdrawing subunits of screening troops and of the general and battle outposts.

Fire support helicopters as well as tactical airborne assault forces and airmobile subunits formed from division personnel can be employed successfully in conducting delaying actions in the forward defense area security zone. They are capable of delivering sudden attacks against the attacking enemy's flanks, forcing him to deploy for combat prematurely and thus delaying his advance, after which these forces rapidly withdraw into the depth.

Combat for a water obstacle begins with the enemy's arrival at the river or when he occupies an initial area for the assault crossing. The American command regards this as one of the basic phases of a defense. During this period maximum damage is inflicted on the enemy by nuclear strikes and the fire of artillery, mortars, antitank weapons and helicopters. Tactical aviation prohibits the approach of enemy reserves or second echelons and delivers strikes against means of nuclear attack, control points and artillery. All controllable nuclear-mine and man-made obstacles set up both on approaches to the water obstacle and directly on the river banks are activated.

If the enemy has succeeded in crossing the river with large forces and wedging into the defense, subunits of first echelon brigades (in case of a mobile defense) conduct delaying actions at a number of successively occupied positions and withdraw to the line of permissible penetration, where they assume a defense together with brigade reserves. In some cases, which are dictated by the situation at hand, it is recommended that the motorized infantry battalions or battalion tactical groups defending directly at the water obstacle firmly hold their areas even if they are enveloped from the flanks.

After the enemy attack has slowed or halted and he still has not been able to consolidate at the line he has reached using his immediate reserves, it is recommended that a counterattack be delivered against him with the division second echelon or reserve (independently or in coordination with army corps reserves). Its primary purpose is to destroy the grouping of enemy troops which has crossed and penetrated and to restore the lost position or create conditions for moving into an attack. In this period of combat it is planned to deliver nuclear, artillery and air strikes against means of nuclear attack, the tank subunits approaching from the depth of enemy reserves, and the organized crossing, and then conduct a counterattack with the reserve.

6904
CSO: 1801/175

IMPROVED FIELD ARTILLERY AMMUNITION

Moscow ZARUBEZHNOYE VOYENNOYE OBOZRENIYE in Russian No 12, Dec 83 (signed to press 15 Dec 83) pp 36-41

[Article by Engr-Col O. Surov: "The Improvement of Field Artillery Ammunition"; passages rendered in all capital letters printed in boldface in source]

[Text] Shielded by the hackneyed myth of the "Soviet military threat" and striving to achieve military-technical superiority over the USSR and other Warsaw Pact states, militaristic circles of the United States and NATO countries are openly proclaiming a course toward stepping up the arms race and developing highly effective models of weapons and military equipment based on the latest scientific-technical achievements.

Placing reliance on the priority development of nuclear and chemical weapons, the military leaders of the aggressive NATO bloc also are accomplishing an extensive program of actions to outfit ground force units and subunits with a new generation of conventional weapons. An important place in the program also is set aside for field artillery, viewed by foreign military specialists as one of the primary fire attack forces of the ground troops.

In the opinion of foreign military experts, the firepower of modern T/O&E artillery systems, the greater portion of which were made operational in the latter half of the 1970's and beginning of the 1980's, can be increased only by improving the ammunition. As reported in the foreign press, these are the primary directions of work in this area: an increase in range and accuracy of fire, an improvement in lethality of ammunition at the target, and creation of qualitatively new ammunition (antitank, chemical, neutron and special-purpose). In addition, much attention is being given to developing more improved fuzes, including proximity fuzes which detonate projectiles in the air and sharply increase their lethality at the target, particularly when firing against personnel in the open.

INCREASING THE RANGE OF FIRE. It is generally known that this depends on the angle of departure, the projectile's flight speed and the air resistance. Foreign specialists believe that the range of fire of organic artillery systems can be increased (without improving the ballistic properties of the gun,

increasing the length of tubes or using more powerful propellant charges) by two methods: placing a power source on the projectile which provides for a build-up in velocity or reduces air resistance; reducing air resistance to the projectile's movement or reducing the weight-to-caliber ratio (the ratio of the projectile's weight to the area of its cross section).

Projectiles which use the first method for increasing range of fire include the following (Fig. 1 [figure not reproduced]): Rocket-assisted projectiles (ARS) with small solid-propellant rocket motors in the base. The ARS's operational in armies of the United States, France, Sweden, Italy and Israel permitted an increase in the firing range of organic guns by 25-30 percent, and the French rocket-assisted mortar rounds permitted a 60-80 percent increase.

Shells with a slow-burning pyrotechnic composition reducing the so-called "bottom suction" (rarefaction of the air behind the bottom of the shell as a result of a disruption of the air flow at its edge), which usually is 30-40 percent of total air resistance. The base portion is being improved (a recess is being made in it) to reduce this effect or a slow-burning pyrotechnic composition is placed in it. In the latter instance, as the foreign press reports, base drag is reduced 50-80 percent, which leads to a 10-25 percent increase in range of fire.

Projectiles with ramjet engines (PVRD), according to foreign specialists' estimates, will allow a substantial improvement in the range of fire of artillery pieces. Their primary merit is that the oxygen needed for fuel combustion is taken right out of the air, but they are complicated in design and costly. According to foreign press reports, the United States began work in the early 1980's on the AIFS (Advanced Indirect-Fire System) program, which envisages creation of a precision, long-range 203.2-mm projectile with PVRD which allows fire to a range up to 70 km. Intended basically for combating tanks, it will be fitted with a homing head and cluster warhead.

Foreign specialists include projectiles with an improved aerodynamic shape and subcaliber projectiles stabilized in flight by rotation or fins among the ammunition in which the range of fire is being increased through a decrease in air resistance or a decrease in the weight-to-caliber ratio. Representing the first type are the 155-mm ERFB (Extended-Range Full Bore) shells (Fig. 2 [figure not reproduced]) developed by the Belgian division of the Canadian-American Space Research Corporation. They have an elongated, spindle shape without a cylindrical portion, and have special projections placed at a certain angle to the longitudinal axis of the body serving as a forward positioning band. The streamlined shape substantially reduced frontal drag while the increased support base (the distance between the positioning bands and the driving band) improved the projectile's stability as it moves along the bore and in flight. According to foreign press reports, the range of 32 km was obtained during firings of this projectile from the new Austrian 155-mm GHN-45 gun-howitzer developed with the participation of the aforementioned firm, and 43 km was achieved with the ERFB Mk 10 Mod 2 projectile (with a pyrotechnic device for reducing bottom suction).

The method of improving firing range by reducing the weight-to-caliber ratio is carried out in manufacturing subcaliber projectiles primarily fired from antitank and tank guns. With respect to subcaliber projectiles for field artillery pieces, they still are in the developmental stage. Such work is being carried on in particular in the United States and the FRG, where experimental models of 155-mm subcaliber projectiles for the M198 and FH70 howitzers have been created.

Foreign military experts consider that a new direction in a substantial INCREASE IN FIRING ACCURACY of field artillery pieces is the development of guided artillery ammunition with homing on the final leg of the trajectory. The United States is attaching special significance to the development of precision ammunition meeting the concept of "fire and kill," inasmuch as the American military leadership perceives this path to be one of the important preconditions for achieving military-technical superiority over the Soviet Union.

The Copperhead M712 with semiactive laser homing head (GSN) became the first foreign guided artillery projectile. Intended primarily for combating tanks, it is fired from the 155-mm gun in the direction of the target and guidance is accomplished on the final leg of the trajectory.

During this projectile's development some foreign authors evaluated it as a "revolution in artillery," and so initially the command element of the U.S. Army and Marines planned to procure 110,000 of them. This number was reduced to 44,000, however, due to the sharp increase in its cost (approximately tenfold), the lower probability of hitting the target than required, and the impossibility of forward observers illuminating targets at ranges greater than 5 km on rugged terrain and in bad weather conditions (fog, rain, snow) and with heavy smoke cover on the battlefield. In the fall of 1982 the U.S. Congress decided to cease series production after the manufacture of some 8,000 projectiles, but the question of an additional order for 30,000 such projectiles presently is being examined.

According to foreign press reports, several types of precision artillery munitions are in various stages of development in the United States. For example, the 203.2-mm rocket-assisted ERGP (Extended-Range Guided Projectile) is being made for the U.S. Army and Marine Corps in two versions, the XM837 and XM838. The first will be fitted with a homing head which reacts to electronic emissions, and the second will have a semiactive laser GSN. They weigh some 115 kg, with a length of 1.55 m and a range of fire up to 40 km. The planned operational date is 1986. The 155-mm precision CGSP (Common Geometry Smart Projectile), with conventional size and shape and intended for combating tanks at ranges up to 24 km, is being developed on a competitive basis by the American firms of Honeywell, Martin Marietta and Raytheon since 1982. The first two firms plan to make a radar GSN for it operating in the millimeter band and Raytheon plans to make an infrared head. It was planned to choose the GSN by mid-1983, after which full-scale development would begin. As American specialists note, in contrast to the Copperhead, the new projectile will fully meet the so-called principle of "fire and forget" (there is no need

to illuminate the target with a laser) and will have improved armor penetration. In addition, it will have the shape and size of organic 155-mm projectiles, which will substantially simplify the problem of troop ammunition supply.

The 203.2-mm projectile being developed under the AIFS program will have one of two GSN's: a passive IR [infrared] head or a radar head operating in the millimeter band. The firm of Martin Marietta is working on the project of a rocket-assisted projectile with a range of fire of 35-40 km, and the firm of Norden Systems is working on a cluster projectile with PVRD fitted with homing warhead elements.

According to a foreign press report, some countries also are developing guided antitank ammunition for mortars. Western experts believe guided mortar projectiles to be an effective means of combating armored fighting vehicles at ranges of 6-8 km. It is noted that a tank will be struck from above, i.e., from the most vulnerable side, thanks to the plunging directory of these projectiles' flight.

The American firm of Raytheon is completing development of the 106.7-mm GAMP (Guided Antiarmor Mortar Projectile) fitted with a bispectral infrared homing head. The projectile has vanes which open in flight and an improved shaped charge. Its firing tests were planned to begin in 1983.

The Swedish firms of FFV and Saab-Scania are conducting joint development of the Stryks 120-mm antitank mortar projectile. Its flight trajectory will be corrected on the homing leg by pulse-jet micromotors situated on the outside of the body. An improved method of data processing which precludes the possibility of the projectile homing on a destroyed target (a burning tank) is planned for use in creating the GSN and electronic control unit. The projectile weighs 15-18 kg, has a length of 750 mm, a maximum range of fire of 8 km, and a flight time to maximum range of up to 60 seconds.

The foreign press also reported the FRG's development of the Bussard 120-mm guided mortar projectile (Fig. 3 [figure not reproduced]) 1 m long, weighing 17 kg and with a semiactive laser GSN.

AN IMPROVEMENT IN THE LETHALITY OF AMMUNITION AT THE TARGET is viewed by foreign military specialists as one of the chief factors for a substantial increase in combat capabilities of artillery units and subunits.

Foreign specialists note that the lethality of fragmentation-HE ammunition against personnel and military equipment in the open depends on the shape and design of the projectile as a whole, mechanical properties of the shell body material, properties of the bursting charge, volumetric efficiency of the VV [explosives], the projectile's attitude at the moment of detonation, and the number and fragmentation velocity of lethal fragments. Based on these factors, they identify the following basic directions for improving ammunition of such types:

--An improvement in fragmentation effect by an optimum selection of the bursting charge, shell body material and projectile design. The use of VV having a high rate of detonation in the ammunition and use of bodies made of heat-treated steel permits an increase in the lethality of a fragmentation projectile by 2-3 times (for example, this indicator for the ERFB Mk 10 Mod 2 155-mm fragmentation-HE projectile described above is twice that of the American M107 projectile of the very same caliber).

--Creation of fragmentation projectiles with preformed fragments (steel balls, arrow-shaped lethal elements) and semipreformed fragments (cuts are made on the inner wall of the shell body to form lethal fragments of a given size and weight when the shell explodes). Ammunition of this type is being used widely in armies of a number of capitalist states: the American 105-mm round containing up to 8,000 steel arrows weighing 0.1-1 gram each; the Swedish 40-mm fragmentation projectile for the L70 antiaircraft gun with up to 2,000 steel balls; the Israeli Cofram 60-mm, 81-mm and 120-mm mortar projectiles with preformed fragments pressed into the body; the Belgian 60-mm and 81-mm mortar projectiles with 600-1,000 semipreformed fragments, and others.

--Development of projectiles with a fragmentation pattern cone oriented toward the target. As yet there are no models of this type abroad. Meanwhile, it is reported that work in this area is being done in Sweden;

--Development of cluster ammunition loaded with a large number of fragmentation or shaped charge-fragmentation warhead elements.* The high lethality of these projectiles is explained by the optimal altitude at which their bodies are opened by a proximity fuze on approach to a group target, the spread of warhead elements over a large area, the increased fragmentation effect of each element, which has grooves in its body for better formation of fragments during detonation, and by the detonation of warhead elements at a height of 1.5-1.8 m from the ground, as a result of which a greater portion of the fragments spread parallel to the earth in a radius up to 7 m.

According to foreign press reports, cluster ammunition with fragmentation warheads will find extensive use in future artillery systems, especially in rocket artillery. For example, NUR's [free-flight rockets] with a warhead containing 644 shaped-charge-fragmentation elements have been developed for the American 240-mm 12-tube MLRS [multiple-launch rocket system] standardized in NATO.

As noted in the foreign press, the basic ways of improving the lethality of shaped-charge projectiles are an improvement in the design and shape of the shaped charges as well as in the material lining the cones of the shaped charges; improved precision in their manufacture; a decrease in the negative influence of the shaped charge's rotation on the action of the shaped-charge jet; choice of the optimal distance between the armor and shaped charge at the moment of detonation; development of so-called "tandem" shaped charges (arranged in succession), which penetrate multilayered armor and are

*For more detail about American cluster projectiles see ZARUBEZHNOYE VOYENNOYE OBOZRENIYE, No 11, 1981, pp 41-42--Ed.

characterized by high behind-the-armor action; and the development of ammunition with a downward-tilted shaped charge activated by a proximity fuze as it flies over a target (destroying it from above).

QUALITATIVELY NEW AMMUNITION FOR COMBATING TANKS is planned to be used chiefly to knock out armored targets located at a rather long distance from the forward edge. A typical feature of this ammunition is that it strikes tanks from above, against their least protected area.

The American 203.2-mm XM836 SADARM (Sense and Destroy Armor) antitank cluster projectile has been under development since the late 1970's on an assignment from the ground forces command element and is expected to become operational after 1986. It consists of a body, three sub-munitions, proximity fuze, a pinned base and a propelling charge. Each sub-munition has a radiometric system (operating frequency of 35 GHz) which provides for the search and detection of an armored vehicle on the terrain, a microprocessor, bursting charge, rotating ribbon parachute and power unit.

The projectile is fired from organic 203.2-mm howitzers in the direction of an area of tank concentration. At a given range and altitude the projectile body opens (pinned base separates) and sub-munitions are ejected, which then descend by parachutes. The longitudinal axis of the sub-munitions is tilted at 30°. This attitude of the sub-munition in space and its simultaneous rotation together with the parachute gives the radiometric system a circular (spiral) scan of the area where tanks are located (Fig. 4). After lock-on of the target the position of its center is determined and the optimal time is computed for detonation of the bursting charge, which functions according to the principle of an impact nucleus and strikes the tank from above.

The 155-mm STAFF (Smart Target Activated Fire and Forget) homing antitank projectile being developed in the United States since 1978 will become part of the unit of fire of close-support guns. Just as with the previous model, it has a radiometric system and bursting charge operating according to the principle of an impact nucleus.

The "P" 155-mm and 203.2-mm armor-piercing projectile being developed by the Swedish firm of FFV together with the West German firm of Rheinmetall will strike targets with heavy fragments. It has been noted that their design implements the principle of a directional fragmentation pattern. The projectile contains two sub-munitions located one behind the other, with preformed heavy fragments weighing 15 and 25 grams, respectively, pressed into their front portions. As the projectile approaches an area of tank concentration the sub-munitions are ejected from the body and burst. Heavy fragments fly in a directed sheaf downward at a speed of 1,600 m/sec and hit the target from above, penetrating armor up to 40 mm thick.

THE DEVELOPMENT OF NEUTRON AND CHEMICAL AMMUNITION is being carried out in the United States, where the 203.2-mm M753 rocket-assisted nuclear projectile (Fig. 5 [figure not reproduced]) with an increased yield of initial radiation (also called neutron yield) and having a TNT equivalent of one kiloton already

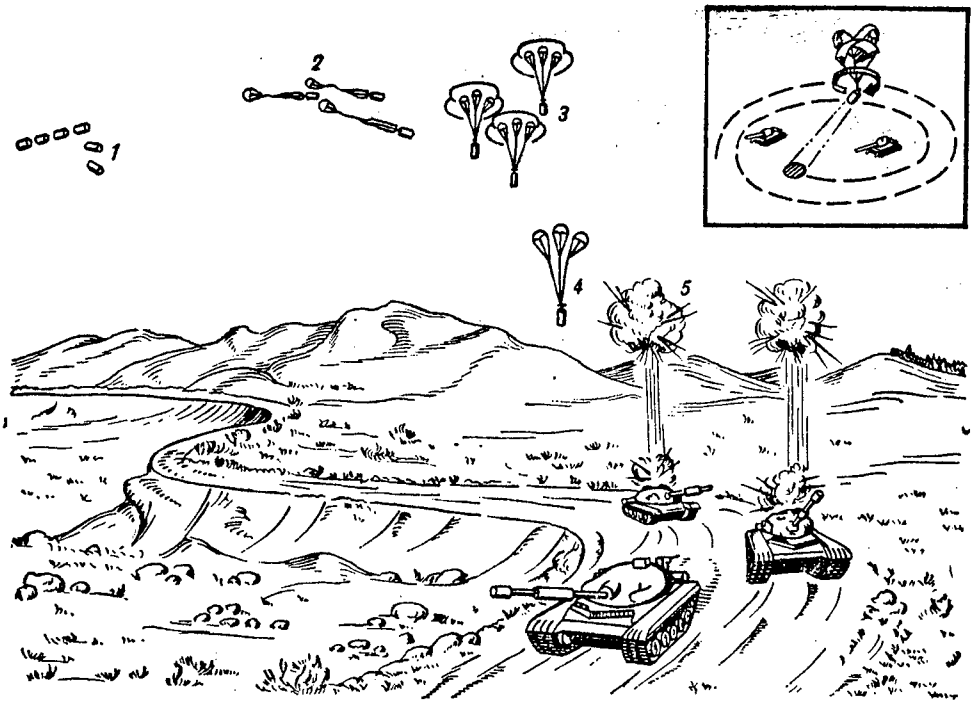


Fig. 4. Diagram showing action of American 203.2-mm SADARM antitank cluster projectile:

1. Projectile body opens and sub-munitions are ejected
2. Brake parachute opens
3. Main ribbon parachute opens
4. Armored target is searched for using radiometric system (spiral scan of terrain)
5. VV charge is triggered and tank is hit by impact nucleus

has been developed and made operational. The production of 155-mm and 203.2-mm chemical projectiles with a binary loading has been organized. The 155-mm XM785 rocket-assisted nuclear projectile is still in the development stage. Plans are to have it replace the M454 T/O&E nuclear munition of the very same caliber.

DEVELOPMENT OF NEW SPECIAL-PURPOSE AMMUNITION is being carried out extensively in NATO countries, according to western press reports. This ammunition is intended for the following purposes: remote mining of the terrain, scattering of acoustic and seismic sensors of reconnaissance-signaling devices in the enemy rear (the American XM694E1 155-mm experimental projectile), delivery of aerial reconnaissance television equipment to the required area (contained in the body of a 155-mm projectile, it is ejected on approaching a given area and surveys the terrain and transmits images to a ground reception point as it slowly descends on a parachute), producing passive jamming of enemy electronics (by ejecting foil from a projectile), and others.

Projectiles for remote laying (by scattering) of antitank mines on likely tank movement routes are the most widespread. In addition to the 155-mm projectiles

(each containing nine belly attack mines) already made operational in the U.S. Army, munitions of this type are included in the unit of fire of the West German LARS 110-mm 36-tube MLRS (the warhead of the NUR contains eight AT-1 antitrack mines or five AT-2 belly attack mines), and NUR's with cluster warheads also have been developed for the new American MLRS (with 28 West German AT-2 mines in each) and the Italian FIROS-25 (seven mines).

In the opinion of western military experts, realization of the directions for improving ammunition examined above will permit a substantial increase in field artillery firepower, and chiefly in its capability of combating armored combat vehicles.

6904
CSO: 1801/175

GEPARD CREW TRAINING EQUIPMENT DISCUSSED

Moscow ZARUBEZHNOYE VOYENNOYE OBOZRENIYE in Russian No 12, Dec 83 (signed to press 15 Dec 83) pp 41-44

[Article by Engr-Maj A. Tomin: "Technical Training Facilities for Crews of Gepard ZSU (Self-Propelled Antiaircraft Mount)"; passages rendered in all capital letters printed in boldface in source"]

[Text] Continuing to build up the Bundeswehr's combat might, FRG ruling circles are outfitting the ground forces with new models of weapons and military equipment. Much attention is being given to beefing up air defense, which in the opinion of the military leadership has a significant effect on success of combat actions.

The primary role in combating enemy aircraft and helicopters at low altitude in covering combat formations of West German divisions is given to the Gepard 35-mm twin self-propelled antiaircraft mount (ZSU). The AAA regiment which is part of every division (except for the airborne division) has 36 such mounts.

The Gepard all-weather self-contained ZSU (Fig. 1 [figure not reproduced]) is capable of performing reconnaissance of air targets while in movement and firing on them from a short halt. Foreign specialists consider it to be the most advanced of all the self-propelled AAA systems in the order of battle of NATO country armies at the present time. At the same time, it is emphasized that for effective tactical employment this ZSU, equipped with a large amount of sophisticated electronics and automatic devices, requires crews with a high level of training as well as appropriate organization of maintenance (TO) and repair. The command element of the FRG ground forces sets aside a large role in accomplishing this task to the set of support equipment which is a component part of the Gepard system. It includes technical means for training (TSO) personnel, monitor-test equipment, tools and devices for performing periodic technical servicing and repair, a set of spare parts, technical descriptions, operating instructions and other documentation.

Judging from foreign press reports, the TSO are subdivided according to purpose into two groups and are intended for accomplishing two tasks respectively: teaching crews combat work, and the crews' acquisition of skills needed for performing TO and repair. The first group includes a multipurpose auditorium trainer, fixed trainer and air target simulator.

The MULTIPURPOSE AUDITORIUM TRAINER (Fig. 2 [figure not reproduced]) is used for initial training of two members of the mount's crew. It is a panel which accommodates display devices, control levers and the majority of pushbutton switches, toggles and adjustment knobs present on the five panels of the Gepard ZSU radar control console. They are similar in external appearance and positioning to corresponding parts of the T/O&E equipment. The work stations of the commander and gunner are set up behind the trainer panel.

An electronic computer controls the training process. It is used to produce the same sequence of operations with panel controls as during combat work on the actual equipment and to determine the correctness with which pushbutton switches and toggles are switched. As the trainees gain skills the program is made more complicated, they perform all actions independently and the signals generated by the EVM [electronic computer] indicate the mistakes made. The given trainer makes it possible for both simultaneous training of a crew commander and gunner as well as for individual work of each of them. In the latter instance the EVM performs the functions of the absent crew member.

The training auditorium is outfitted with six multipurpose trainers at which 12 persons acquire necessary skills simultaneously under the direction of one or two instructors.

The FIXED TRAINER (Fig. 3 [figure not reproduced]) is intended for the development and reinforcement of skills acquired during work on a previous model and for developing the ability to get one's bearings in relatively simple versions of a tactical situation. The trainer is made in the form of a hut consisting of two compartments. The first, which accommodates the equipment and work stations of the crew commander and gunner, is similar to the fighting compartment of the Gepard ZSU. The second compartment, separated from the first by a partition with a glassed-in upper part, is fitted with the instructor's work station. Panels and controls are mounted on the lower part of the partition, and the instructor uses them to designate the tactical situation and monitor the trainees' work.

The AIR TARGET SIMULATOR is used in the final phase of crew training when the trainees already have gained firm work skills on the fixed trainer and have moved on to work directly on the equipment of training ZSU's. Used together with the T/O&E equipment of the ZSU fire control system, the simulator allows making the work conditions of the crew commander and gunner approximate those of combat to the maximum, as foreign specialists assume. The air situation set up on the plan-position indicator and in the optical sight is designated with the help of programs recorded on magnetic tape and stored in the simulator's memory.

The maximum number of targets used to create a situation must not exceed three. Each of them can be identified as friendly or enemy. The air target simulator can be used to input different kinds of target maneuver or versions of an ECM situation, or to create a situation of firing against targets which have appeared suddenly. It is used for teaching combat work throughout the entire cycle of preparation for firing, beginning with the moment a target blip appears on the plan-position indicator and ending with the opening of fire.

The second group of TSO's is intended for preparing personnel operating the Gepard ZSU to perform TO and repair, and it consists of three sets of equipment.

The SET FOR TEACHING 'TO' AND REPAIR OF ELECTRONICS (Fig. 4 [figure not reproduced]) includes the equipment of the ZSU fire control system and navigation system. It is intended for familiarization with its design and functioning and for acquiring skills in performing periodic technical servicing, in troubleshooting and remedying malfunctions. The set's equipment is mounted on a metal base and is similar to that accommodated in the mount's turret (with the exception of the navigation gear located in the ZSU hull). The set allows familiarization of trainees with the operation both of individual devices and of the overall fire control system. The built-in equipment for monitoring technical status and displaying malfunctions is used for troubleshooting.

A digital computer, with the instructor's work station set up at its panel, permits controlling the set equipment and simulating turret rotation in the horizontal plane (and vertical gun movement), the ZSU's movement and tilts of its hull, and it allows measuring the projectile's muzzle velocity. The computer is used to simulate malfunctions of individual units and to control special circuits providing safe conditions for performing periodic technical servicing and repair work. As trainees gain skills in locating and remedying malfunctions, the instructor increases program complexity and simulates comprehensive malfunctions of the fire control system gear and navigational equipment.

The SET FOR TEACHING 'TO' AND REPAIR OF WEAPONS (Fig. 5 [figure not reproduced]) consists of a 35-mm automatic gun, hydraulic mechanism for loading and belt feed of ammunition, projectile muzzle velocity sensor, and electronic units and auxiliary devices supporting their functioning. All equipment is installed in a welded metal frame, the design of which provides for convenience in performing periodic technical servicing, troubleshooting and repair of each component of the set.

The SET FOR TEACHING 'TO' AND REPAIR OF THE POWER UNIT includes ac and dc generators with converters and auxiliary electrical equipment; power servodrives for vertical gun laying and horizontal turret control with balancing mechanisms; mechanical and electrical load simulators; and panels with controls and displays.

All three sets are transportable. When set up at a chosen technical position intended for personnel training, they are leveled horizontally with the help of jacks mounted on each one's metal base. The foreign press notes that use of such sets permits trainees to study the design and functioning of the Gepard ZSU equipment in the established time periods under the direction of instructors and to gain necessary practical skills in performing tuning and adjustment work, locating and remedying malfunctions, and using the monitor-test equipment, tools and devices prescribed for these purposes.

The western press notes that the equipment for performing TO and repair allows keeping the Gepard ZSU in high combat readiness to a significant extent and

fixing malfunctions quickly under field conditions, primarily by replacing faulty units.

In the opinion of West German military specialists, the maintenance and repair of the Gepard ZSU is best accomplished at four levels. At the first level work is performed by the crew and consists of a check of the equipment's functioning, adjustment of certain parameters and performance of routine maintenance.

The second level is accomplished by repair teams whose primary tasks are to perform scheduled periodic technical servicing and to locate and remedy malfunctions which cannot be done by the ZSU crew. To this end each repair team has at its disposal monitor-test equipment, tools, devices and spare units needed for repairing all of the mount's subsystems.

The third level of TO (performed by the repair teams and fixed unit repair shops) assumes the accomplishment of such tasks as troubleshooting in units which have come from the second level of servicing, their repair by replacement of the faulty assemblies and modules, and a functioning check of the restored unit. The mobile repair shop which accommodates all equipment of the repair team of the second or third level is made in a container form and is installed on the bed of a truck.

The fourth level of maintenance is accomplished by industrial enterprises and consists of a major overhaul of the ZSU after expiration of the service life, and repair of faulty assemblies and modules or their replacement with new ones when their restoration is impossible or economically inexpedient.

Judging from foreign press reports, the following monitor-test equipment is used in performing TO and repair of the Gepard ZSU: target trajectory simulator, automatic monitor-testing station, and units for testing the radar, electronic and hydraulic devices, power supply system and power servodrive.

The target trajectory simulator serves for monitoring the functioning of the primary and reserve computation devices (SRP's) of the ZSU and for storing required parameter values without switching on the target tracking radar equipment. Its memory stores current values for azimuth, angle of site and range received from the radar when tracking a target for a number of type trajectories of the target's flight. During a check these data are sent to the SRP and the current values of coordinates and commands to the drives for laying tubes on a future position which are produced there are compared with previously computed values stored in the simulator memory. The SRP's work is considered normal if there is a deviation in parameters being compared for no more than ten percent of measurements performed during the test. The simulator also is used to identify circuits leading to large errors in the computation device.

The automatic monitor-testing station is intended for a comprehensive check of the fire control system equipment and for identifying malfunctions in unit elements and assemblies, the malfunction of which has been set in advance by

means of the built-in technical status monitoring and malfunction display equipment or during a check with the help of the target trajectory simulator. One of 20 test programs stored in the EVM memory which allow a check of all types of units can be used for locating a faulty assembly of an unserviceable unit. The operators' work is simplified thanks to the panels whose displays show the necessary sequence of operations (Fig. 6 [figure not reproduced]).

This station is used both at the second and third level of TO. In view of the fact that in the latter instance there is a search for malfunctions of smaller elements and assemblies, the station's capabilities are increased through the use of additional memory units with test programs.

6904
CSO: 1801/175

GROUND TRAINING EQUIPMENT FOR AIR CREWS SURVEYED

Moscow ZARUBEZHNOYE VOYENNOYE OBOZRENIYE in Russian No 12, Dec 83 (signed to press 15 Dec 83) pp 54-58

[Article by M. Shadrin: "Use of Aircraft Simulators"; passages rendered in all capital letters printed in boldface in source]

[Text] The military leadership of the aggressive imperialist NATO bloc considers one of the important components for a further build-up in aviation's combat power to be a continuous improvement in the flying proficiency of combat aircraft crews. The foreign press reports that various types of ground air trainers are used widely in the pilot training system of the United States and other countries of the North Atlantic Alliance to accomplish this task.

In the opinion of western military experts, modern trainers permit simulating flying conditions with high precision, studying the capabilities of various systems of aircraft being designed, and practicing the skills of flying, navigation and tactical weapons employment. The trainers can be used to simulate purposefully the varied flying conditions which are not always possible to create or are even dangerous to create during an actual training flight. The use of trainers permits saving aircraft life and fuel, effectively improving the air schooling of pilots and other crew members, and reducing the number of flying accidents, the expenditure of ammunition and the density of air traffic.

Several approaches exist for classifying trainers, and in particular they are subdivided by purpose into integrated, specialized and procedural trainers. The technical capabilities of integrated trainers permit pilots (or crews) to practice their actions throughout the range of flying conditions of a specific aircraft or helicopter in accomplishing various combat missions. Specialized trainers are intended for training in the performance of one or more individual phases or elements of flights, such as instrument flying and actions in an emergency, or for instilling skills of controlling on-board weapons, ECM systems and so on. Procedural trainers serve to teach flight personnel to work with individual elements of aircraft equipment.

Depending on where they are installed, the trainers are fixed (accommodated in special rooms at air bases and at training centers) or mobile (mounted in vans and containers which can be carried by some kind of transport).

Both specialized and aircraft construction firms participate in the development and production of trainers. The largest of them are Singer (the divisions Link in the United States and Link-Miles in Great Britain), the British Redifon, the Canadian CAE Electronics, the French Thompson-CSF (a division of LMT), as well as the aircraft construction firms of General Electric, McDonnell Douglas, Boeing, Grumman and a number of others.

As the foreign press notes, recent years have seen a noticeable increase in the number or orders for aviation ground trainers on the part of air forces of the United States and its NATO allies. In concluding contracts with the manufacturing firms, the corresponding military departments provide them with all the required factual or computation data on an aircraft and on its on-board gear and equipment. The former are provided when ordering a trainer for preparing crews of an already existing aircraft, and the latter if the aircraft still is in the development stage. Brief information about selected integrated and specialized trainers existing or being developed abroad is given below on the basis of articles published in the foreign press.

INTEGRATED AIR TRAINERS are being widely used in the air forces of NATO countries, judging from western press reports. They are very sophisticated technical devices permitting an entire crew to practice its actions in all flight conditions and phases. Such a standard trainer usually includes a cockpit,* fitted out like the cockpit of a real aircraft and having a certain number of degrees of freedom (from three to six); simulators of phenomena accompanying a real flight (engine noise, vibrations, overloads and so on) as well as simulators of targets, weather conditions, the effects of enemy REB [electronic warfare (EW)] capabilities and so on; a system of visualization, i.e., representation of the situation outside the cockpit (air and ground); an EVM [electronic computer] for control of trainer systems; and an instructor's or tester's console.

The Singer firm builds trainers for teaching pilots to fly the A-10 ground attack aircraft. One of them (with two aircraft cockpits) is installed at Williams Air Force Base, Arizona. It has systems for moving the cockpits in six directions and for simulating the forces acting on a pilot. A visual display of the situation outside the cockpit provides a field of view in a 300° sector horizontally and 110° vertically. When flying in formation the trainee feels the effect of the wake of the aircraft flying ahead, and peals of thunder and the impact of hail also are simulated. This trainer also can be used for practicing missions involving strikes against ground targets.

*A new direction has been seen abroad in recent years: making multicockpit integrated trainers for simultaneous (joint or individual) training of several pilots--Ed.

A Singer trainer installed at Luke Air Force Base in Arizona is intended for training crews to conduct aerial combat. It includes two cockpits of the F-4 fighter mounted on moving platforms with six degrees of freedom, a visualization system, EVM, control consoles, and data recording and display equipment. The visualization system is made in the form of a dome-shaped facility with eight pentagonal screens (cathode ray tubes) on which the surrounding situation and enemy aircraft is generated with the help of the EVM. The ground is reproduced in the form of a grid of squares 1.6 km on a side (at a certain scale). With a decrease in "flight" altitude the size of the squares increases accordingly. The enemy aircraft is displayed with the help of a conventional television camera and an aircraft model on a gimbal suspension. Sound effects are reproduced in simulating aerial combat and the EVM outputs information to the pilot about firing accuracy and reasons for a miss. When "maneuvers" are executed, the moving platform recreates the effect of shaking and buffeting, and special suits and seats reproduce the effect of an overload. A reduction in visual acuity during an overload is simulated by reducing the intensity of light in the pilot's field of view. Based on an order from the U.S. Air Force Tactical Air Command, it was planned to produce advanced visualization systems for such trainers for the purpose of simulating the situation outside the cockpit both in aerial combat and when attacking ground targets.

Singer also made a trainer for preparing F-16 pilots which makes it possible to simulate the fighter's control from take-off to landing. Deliveries of such trainers began in 1980. Seven units were ordered for the U.S. Air Force, five for the air forces of Belgium, Denmark, the Netherlands and Norway, and five for other countries which are potential purchasers of F-16 aircraft. It includes conventional flight simulator components. In the future the U.S. Air Force plans to supplement it with a device simulating operation of EW equipment and the airborne radar.

The American firm of Reflecton made a trainer for preparing A-10 ground attack pilots which permits simulating operation of flight control system instruments, communications equipment, various displays, airborne EW capabilities and weapons. It can be used to simulate more than 200 kinds of malfunctions including total or partial failure of the power plant and control system. Also simulated are changes in the aircraft's aerodynamic characteristics in various instances which may occur in flight. The visualization system provides for total simulation of the situation during take-off, landing and in aerial combat. At the same time, practices in weapon employment are limited to the simulation of the final phase of the aircraft's target run.

The Goodyear firm supplied the U.S. Air Force with seven flight simulators for training F-15 fighter pilots. At the present time they are being used at Luke, Langley, Holloman and Eglin air bases (all on U.S. territory), at Bitburg Air Base in the FRG and at Kadena Air Base in Japan [sic]. The U.S. Air Force ordered another three simulators from the firm, which in contrast to the previous ones will be outfitted with seats with inflatable cushions to simulate overloads acting on a pilot during flight. The new simulator is intended for teaching pilots flying, navigation, work with flight equipment, and actions in emergency situations and in aerial combat.

In addition to the U.S. Air Force, simulators also are widely used in air forces of other NATO countries. For example, the British Air Force has Singer and Refifon Simulation simulators for training the crews of Tornado aircraft. They are used to practice performance of missions for isolating the area of combat actions. The trainers simulate the tactical flight performance and handling qualities of this aircraft with high precision under various flight conditions and they reproduce possible malfunctions of its on-board systems and emergency situations, with simulation of the on-board navigation and communications systems, radars, equipment for terrain following flight, reconnaissance equipment and all kinds of weapons present on the actual aircraft.

The firm of CAE Electronics concluded a contract for delivery of five simulators to the FRG Air Force and two to the Italian Air Force for training crews of Tornado aircraft. Each of them, except for the cockpit (Fig. 1 [figure not reproduced]), which is mounted on a platform with six degrees of freedom, and other equipment, includes a visualization system (developed by the Messerschmitt-Boelkow-Blohm firm using experience of the General Electric firm) in which the display is generated by an EVM with consideration of the aircraft's angular orientation, location and flight altitude which are being simulated. The synthesized external situation is displayed on screens placed ahead of the cockpit canopy. The display on them can change 30 times a second and the system also is capable of simulating the view from the cockpit under bad weather conditions and at night.

As pointed out earlier, SPECIALIZED TRAINERS are intended for practicing individual phases or elements of a flight on the ground. They also are used extensively in military aviation of the capitalist states, especially the United States and its allies in the aggressive NATO bloc.

According to foreign press reports, the United States has built an experimental simulator for training operators of the fueling equipment of KC-135 tanker aircraft. The American Strategic Air Command believes that it will permit a substantial decrease in the use of KC-135 service life for training, decrease the load on air space, and train operators with better quality and less risk. The simulator's basic elements are a copy of the operator's work station, including controls and displays, and models of a flight refueling probe and a B-52 bomber (models of other aircraft such as the C-5 and FB-111 can be installed in place of the latter). Movement is simulated through a system of visualization of the external situation (the trainer itself is fixed), which transmits three-dimensional images of the probe, the aircraft being refueled, and the landscape.

The firm of Link-Miles developed the NAST trainer for training navigators of Tornado aircraft in the inventory of British, West German and Italian air forces. It is installed in a joint crew training center (Cottesmoor Air Station, Great Britain). It includes a trainee cockpit (for the navigator-operator of aircraft electronics) fitted with all instruments and display systems; an instructor cockpit; an EVM of the Interdata firm and auxiliary equipment. The trainer permits simulation of the work of the inertial navigation system, Doppler radar, terrain following gear and radio altimeter, and it

gives the instructor an opportunity to introduce various malfunctions of on-board systems. All data going to displays in the trainee cockpit are duplicated on the instructor's instrument panel.

The United States developed the AN/AVN-1 astronavigation system for giving flight personnel practice in the methodology of stellar orientation. It allows the reproduction of 41 stars (including the North Star), three planets, the Sun and the Moon with consideration of time of day, location, and the aircraft's altitude and course. The trainer has an EVM, inertial and Doppler systems and other navigation equipment.

A specialized trainer of the firm of Systems Designers is installed at the Lossiemouth Air Station of the British Air Force. It is intended for training Jaguar fighter-bomber pilots in the use of on-board weapons. Its set includes basic elements of the aircraft's sight-navigation system. Flight conditions (course, speed, altitude) as well as target coordinates and kind of weapon are introduced into the simulator in conformity with the flight plan. Then the trainee performs the mission in real time, orienting himself on his cockpit's instrument readings.

The British firm of Marconi produced five portable simulators for practicing the actions of pilots of the Sea Harrier vertical or short take-off and landing aircraft in emergency situations while flying both from a ground airfield and from the deck of an air-capable ship. Each of the trainers resembles a suitcase in shape and size when folded up. The trainer consists of a microprocessor and other microelectronic apparatus, as well as models (at two-thirds natural size) of flight equipment panels with the most important displays and controls. The trainer is supplied with a built-in device for an automatic serviceability check and a system for outputting visual signals in response to the pilot's incorrect actions.

According to the foreign press, NATO countries have a large number of ground trainers for helicopter crew training, and they are most widespread in the United States. They are used to prepare the crews of attack, reconnaissance, transport and other helicopters.

Similar trainers also are being used in the military aviation of other member nations of this bloc. For example, in June 1980 a trainer for preparing crews of Lynx helicopters (made by the Redifon firm) became operational at Yeovilton Air Station in Great Britain. It permits teaching the pilot and operator to employ on-board weapons under conventional (normal) conditions, with the appearance of equipment malfunctions, and under extraordinary circumstances, and to perform combat missions both independently and in coordination with a ship. British specialists calculate that the use of such trainers will make it possible to reduce the number of actual flights and decrease fuel consumption by 15 percent.

According to the western press, NATO countries regularly use the simulators of commercial airlines in the process of training flight personnel of military aviation, especially the crews of aircraft made on the basis of civilian

liners. For example, flight crews of the E-3A AWACS and KC-135 tanker aircraft train on simulators made for pilots of the Boeing 707 passenger liners, and crews of the E-4A and E-4B airborne command posts train on ground training complexes of the Boeing 747 aircraft, and so on.

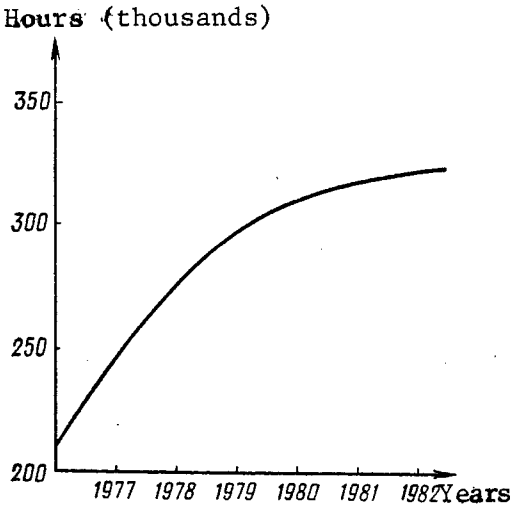


Fig. 2. Chart showing flying hours saved through use of trainers in U.S. military aviation

On the whole, in the estimate of foreign specialists, use of trainers permitted improving the system for training flight personnel, saving aircraft service life, reducing fuel consumption, and so on. For example, in 1980 U.S. military aviation managed to save some 300,000 flying hours. According to their estimates, this figure will increase subsequently (Fig. 2).

As the foreign press reports, in addition to training flight personnel, the simulators also are widely used for training various ground specialists. In particular, the United States made a special simulator for equipment of the air traffic control tower. Its computer programs, devices for simulating sound effects, and panoramic screen allow re-creation of the situation where aircraft (up to 12) are flying in the vicinity of an airfield during the day or during hours of darkness. The simulator programs contain data of existing and developmental military aircraft, and military air controllers are trained on it. A mobile version also has been developed which uses real information on air traffic in the vicinity of a particular airfield from the radars of the UVD [air traffic control] service which are connected to it.

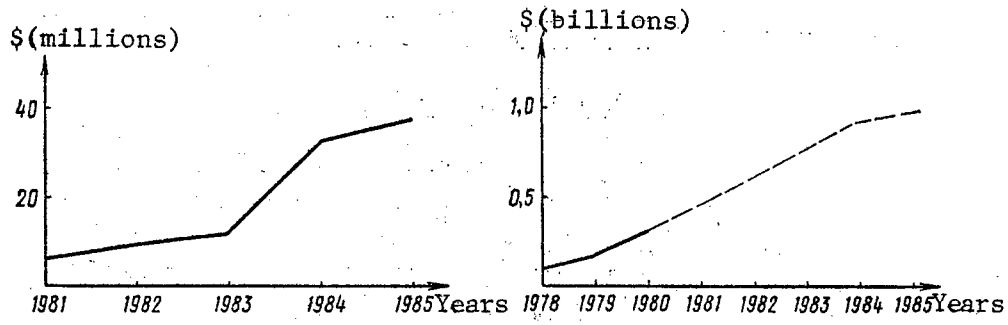


Fig. 3. Charts showing increase in appropriations for R&D to develop trainers (on left) and for their purchase for the U.S. Air Force (on right)

Considering the great importance of trainers in the personnel training system of military aviation and the importance of increasing its combat readiness overall, the command element of NATO country air forces is giving more and

more attention to modernization of existing equipment and development of new equipment for this purpose. Appropriations for these purposes are increasing continuously. In particular, in 1985 more than $30 million will be allocated for the U.S. Air Force alone for performing R&D to develop trainers, and almost one billion dollars will be allocated for their purchase, which exceeds the 1981 level by several times (Fig. 3).

As reported by the western press, work on developing a new generation of trainers abroad is being conducted chiefly for the purpose of improving the precision and authenticity of simulation and bettering their methodological merits, operating qualities and economic indicators. In the opinion of NATO military specialists, successful resolution of these problems will permit a considerable expansion in the future of the capabilities of trainers for preparing personnel of bloc member nation air forces, which will lead to an improvement in the proficiency of flight crews and the combat might of aviation as a whole.

6904
CSO: 1801/175

SUSPENDED RECONNAISSANCE PODS

Moscow ZARUBEZHNOYE VOYENNOYE OBOZRENIYE in Russian No 12, Dec 83 (signed to press 15 Dec 83) pp 59-65

[Article by Engr-Lt Col S. Alekseyev]

[Text] In recent years suspended pods with reconnaissance equipment have been developed abroad to expand aviation's capabilities to conduct aerial reconnaissance. Such pods can be used to equip attack aircraft (chiefly tactical fighters) and helicopters for use as scouts. It is believed that practically any aircraft equipped with such a pod (it is recommended that there be one for every three aircraft) will be capable of performing reconnaissance missions. Characteristics of selected models of pods, compiled from foreign press articles, are given in the table at the end of the article.

The pods have the shape of a suspended fuel tank. The main frame consists of milled ribs and longitudinal members. The skin is made of aluminum alloys. Standard ventral or underwing pylons for external stores are used for installing the pods on the aircraft (Fig. 1 [figure not reproduced]). The pods with complete equipment weigh 100-500 kg, they are 2-3 m long and they can withstand 4-7 G's.

The pods usually have a modular design and are fitted out with gear having a high degree of unitization and standardization. In the opinion of foreign specialists, this permits changing their make-up easily depending on the assigned mission and at the same time it provides simplicity in modernization and an opportunity to install more sophisticated reconnaissance equipment. As a rule, a pod includes 2-3 aerial cameras (AFA) and an infrared [IR] line scanner or pulse illumination unit (Fig. 2 [figure not reproduced]). Larger pods (weighing 500-1,000 kg and with a length of 3-7 m) also are being developed which can accommodate up to five AFA's, an IR station and side-looking radar (RLS BO). There also are light pods (weighing 35-100 kg and with a length of around one meter) intended for use at subsonic flight speeds and low altitudes. At times they even have a plastic skin and accommodate one or two compact AFA's or an IR system. The majority of pods are intended for mounting reconnaissance equipment in several versions, which permits their use in

performing various missions (day or night reconnaissance, from low or high altitude, and so on).

With the exception of a panel and control unit accommodated in the pilot's cockpit, all reconnaissance gear is within the pod, and so no changes in aircraft design are required for their suspension. Only a minimum number of connections with aircraft systems have to be made for this purpose, and the time needed to suspend or remove pods is from four minutes to one hour depending on their types.

Electrical power and reference signals from the aircraft platform are sent to the pod equipment by cable through a plug and socket connection. There also are pods with self-contained power systems. For example, in the Vicon-75 pod developed by the British firm of Vinten and in the American KS-128 intended for night aerial photography, the operation of pulse illumination units is supported by self-contained three-phase generators driven by the air turbine.

The pods most often mount compact, automatic AFA's (with a film width of 70 mm). Foreign specialists believe their advantages to be small size and weight, simplicity of pod mounting, use of a small amount of film, and the resultant acceleration of its photochemical processing. The significant increase in resolution of modern photographic optics and film as well as the introduction of interpretation methods based on enlarged screen images also contributed to the use of compact AFA's. Medium-format AFA's (127 mm film) also can be mounted in the larger pods.

According to western press reports, the United States has developed a number of long focal-length aerial cameras which allow conducting oblique daytime aerial photography when flying along state borders to a depth up to 110 km without the reconnaissance aircraft entering the air space of the country being reconnoitered. Two of them, the KA-102A (Fig. 3 [figure not reproduced]) and the KA-112A, are in a pod version. An electronic unit also has been developed for the KA-102A AFA in which the photographic film is replaced with a solid-state matrix receiver on devices with charge communications, contained in the focal plane of the lens. Equipment for converting video signals to digital form and for multiplexing and transmitting data over a radio channel to a ground receiving point is mounted in the pod. The AFA with electronic unit (designated the KA-102A/EO) permits conducting reconnaissance in a near-real time frame. The ground equipment includes gear for receiving, processing, displaying and automatic interpretation of the reconnaissance data.

IR line scanners which are part of the pods' reconnaissance equipment operate in the 3-5 or 8-14 micron bands. Scanning the terrain within the limits of angles of 120-140° in a direction perpendicular to the aircraft's course, they permit recording on film an image which reflects the natural thermal emissions of the terrain (Fig. 4 [figure not reproduced]). Details of terrain relief and ground facilities can be distinguished in the photos, and it is even possible to detect underground objects with thermal emissions. These sets are used for around-the-clock reconnaissance of targets camouflaged by tree

foliage and T/O&E camouflage equipment, and in the presence of smoke, light fog and rain. They weigh 30-130 kg, have an angular resolution of 0.5-2 millirads and a temperature resolution of 0.1-0.3°C. They can be used to perform reconnaissance at flight speeds of Mach 0.6-0.95 from altitudes of from 60 to 3,000 m.

In the opinion of foreign experts, a problem of vibration stability of the reconnaissance gear located in suspended pods arises when they are used, since standard attachment points do not provide for the permissible vibration level, which affects the resolution of imagery. Therefore, in order to improve the connection with the pylon, aerodynamic fairings of a special design, vibration insulators and shock absorbers are being developed for the docking points.

Temperature variations within the limits of 0-40°C involve a change in the AFA's focal distance of from -0.25 mm to +0.2 mm, while a decrease in pressure corresponding to a change in flight altitude from 300 to 9,000 m changes the focal distance by 0.5 mm. To reduce the effect of these factors, thermal stabilization and pressurization of the pods is employed. It is believed that a change in focal distance of $\pm$0.3 mm leads to a threefold degradation of the AFA's resolution. As a rule, temperature in the pods is maintained within limits of 35-40°C.

Within many pods are units for converting data from the aircraft's inertial navigation system (course, longitude, latitude), with information from them placed on the image of the terrain being photographed.

Judging from foreign press reports, at the present time the main NATO countries are developing new suspended pods. Chief attention is being given to improving the equipment installed in them, optimizing its make-up, improving characteristics, increasing vibration stability and reducing weight. It is believed that use of such pods will permit the missions facing aerial reconnaissance to be accomplished to a greater extent.

Basic Characteristics of Selected Reconnaissance Pods

Pod Name or Designation and Country-Developer	Purpose	Versions and Equipment Configuration	Size, cm[1] / Weight, kg	Aircraft Platform	Remarks
1	2	3	4	5	6
TARPS, USA	Daytime reconnaissance from high or low altitudes, night reconnaissance from low altitudes	First: KS-87B (152)[2] AFA for oblique forward photography, KA-99 (228) AFA for panoramic, low-altitude photography, AN/AAD-5 IR line scanner, television viewfinder Second: KS-87B (152) AFA for forward oblique photography, KA-93B (610) AFA for panoramic, high-altitude photography, AN/AAD-5 IR line scanner, television viewfinder Third: KS-87B (152) AFA for forward oblique photography, KA-99 (228) for low-altitude panoramic photography, KA-93B (610) AFA for high-altitude panoramic photography, television viewfinder	214x26.5x27.5 / 545	F-14 Tomcat	Passed flight tests. U.S. Air Force purchased 48 pods
KA-102A, USA	Daytime high-altitude reconnaissance at ranges up to 110 km	First: KA-102A (1680) AFA for oblique photography Second: KA-102A/EO electro-optical reconnaissance station with data transmission over radio channel	422x56 / 714	F-4, RF-4, F-5, RF-5	When photographing from an altitude of 12 km, resolution on the terrain is 45-60 cm at a distance of 37 km using Type 3340 film
KA-112-A, USA	Daytime high-altitude reconnaissance at distances up to 110 km	KA-112A (1829) AFA for panoramic photography	567x67 / 581	F-4, F-5, Mirage-3 and -5	
KS-128A, USA	Nighttime low-altitude reconnaissance	Pulse electronic illumination unit operating in the near IR band, three-phase generator driven by air turbine	-	RF-4C	Two KS-87B (152) AFA's are installed in the aircraft nose
-, UK	Daytime low-altitude reconnaissance	F-135 AFA with two lenses for stereo photography (38) and for forward oblique photography, two F95 Mk 7 (76) AFA's for right-left oblique photography at angle of 37°18′, two F95 Mk 7 (152) AFA's for oblique right-left photography at angle of 19°11′	254x47 / 185	Harrier-GR.1	The AFA's can be turned on as groups or singly
-, UK	Daytime and night reconnaissance from low and medium altitudes	First: F95 Mk 7 (152) AFA for forward oblique photography, two F95 Mk 10 (38) AFA's for vertical photography, two F95 Mk 10 (76) AFA's for oblique right-left photography, IR line scanner Second: One F126 (152) AFA is installed in place of two F95 Mk 10 (76) AFA's for oblique photography from medium altitude	-	Jaguar	AFA's mounted on two rotating drums. Used by UK and FRG air forces
EMI firms, UK	Day and night reconnaissance from low and high altitudes	F95, F126 and F135 AFA's, IR line scanner, SLAR	724x. / 1043	Phantom-FGR.2	

Basic Characteristics of Selected Reconnaissance Pods

Pod Name or Designation and Country-Developer	Purpose	Versions and Equipment Configuration	Size, cm[1] / Weight, kg	Aircraft Platform	Remarks
1	2	3	4	5	6
Multipurpose pod, UK	Day reconnaissance from high and low altitude, night low altitude reconnaissance	First: Two F126 (152) AFA's for forward and rear oblique photography from high and medium altitudes Second: Two F135 AFA's for stereo photography forward and back from low altitude, F126 AFA for forward oblique photography Third: Two F135 AFA's for forward and rear stereo photography from low altitude, IR line scanner	466x59	Nimrod, Harrier, Jaguar, Phantom	Used by UK Air Force
Light general-purpose pod, UK	Day low-altitude reconnaissance	First: Four Type 360 (76) AFA's for horizon-to-horizon photography Second: Type 750 (76) AFA for panoramic photography	244x50 71 (in first version), 46 (in second version)	Light aircraft and helicopters	
Vepa-1, UK	Day and night low-altitude reconnaissance	Three small-format frame AFA's (37) for horizon-to-horizon photography, Type 212 IR line scanner	244x38x42 88	Defender, helicopters	70 mm film
Type 751, UK	Day and night low-altitude reconnaissance	Several small-format AFA's or IR line scanner	75x42x34 22.3 (less gear)	Light aircraft and helicopters	Pod body of light alloy
Vicon 18, UK	Day reconnaissance from low and medium altitudes	Five Type 360/140A or Type 518 AFA's, of which one (152) is for forward oblique photography, two (76) are for right-left oblique photography, two (44) are for vertical photography	290x45 172	F-104, Mirage-3, SAAB 105	A television camera can be installed in place of the AFA for oblique photography
Vicon 25, UK	Night low-altitude reconnaissance	Three Type 591 Mk 2 (-) AFA's for forward and vertical photography, overall field of view 40x120°. LS-129A pulse illumination unit consisting of four xenon bulbs	427x48 190	Draken	Permits taking stereoscopic photographs from altitude of 100-120 m or photographs with a 10-percent overlap from altitudes greater than 300 m
Vicon 57, UK	Day reconnaissance from high and low altitudes, night low altitude reconnaissance	Type 690 (457) AFA for vertical photography and for oblique photography ahead, right and left (six fixed positions), three Type 880 (38) AFA's for horizon to horizon photography in transverse direction, HSD-401 IR line scanner	412x58 314	F-104, Mirage-3, SAAB 105	
Vicon 70, UK	Day and night low altitude reconnaissance	First: AFA for forward oblique photography, AFA permitting change in optical axis angles of inclination for vertical and right-left oblique photography Second: AFA for forward oblique photography, AFA for panoramic photography in transverse direction Third: AFA for forward oblique photography, IR line scanner	118x36 35	Light aircraft and helicopters	70 mm film

Basic Characteristics of Selected Reconnaissance Pods

Pod Name or Designation and Country-Developer	Purpose	Versions and Equipment Configuration	Size, cm[1] / Weight, kg	Aircraft Platform	Remarks
1	2	3	4	5	6
Vicon 75, UK	Day and night low altitude reconnaissance	Several small-format AFA's, electronic flash illumination unit operating in near IR range, three-phase generator driven by air turbine	295x38x42 / 170	Mirage-3, SAAB 105	
RIGEL, UK	Day and night low and medium altitude reconnaissance with data transmission over radio channel to ground point	Type 214 IR line scanner, low light-level television camera, command radio line receiver, unit for data transmission over radio channel	145x38 / 60 (less gear)	Tactical reconnaissance aircraft	Flight tests of experimental model have been conducted. Ground equipment complex housed in van
Vicon 91, UK	Day medium and high altitude reconnaissance	Type 690 (915) AFA for oblique and vertical photography. Optical axis can be set vertically or inclined right or left in lateral direction in four positions at angles of 8, 16, 24 and 32° to aircraft longitudinal axis	250x51 / 110 (less gear)	-	Used at altitudes of 1,500-9,000 m
Dornier, FRG	Day and night low and medium altitude reconnaissance	KRb6/24 (60) AFA with five lenses for horizon to horizon photography, IR line scanner, three-phase generator driven by air turbine, photo cartridges for night reconnaissance	-	G.91, F-4E, Mirage-3, Mirage-F.1, F-5, Jaguar	Placed one next to the other, providing overall field of view of 183° perpendicular to line of flight. Five frames registered simultaneously on 240-mm film
-, FRG, Italy	Day high and low altitude reconnaissance, night low altitude reconnaissance	Zeiss (610) AFA allowing change in optical axis angles of inclination, for vertical and oblique photography, Zeiss AFA (610) for panoramic horizon-to-horizon photography, IR line scanner	410x58 / 380	RF-104G, Tornado	It is planned to produce 26 pods for FRG Air Force and 20 for Italian Air Force
Matra light pod, France	Day low and medium altitude reconnaissance, night low altitude reconnaissance	First: Two small-format AFA's (38, 50, 75 or 100) for vertical and oblique photography Second: Small-format AFA for panoramic photography Third: AFA for spectrozonal photography Fourth: AFA for cartographic photography Fifth: IR line scanner	190x. / 60 (with Omera-61 AFA)	Light aircraft and helicopters	Pod body of plastic
Type 155R, France	Day and night low and medium altitude reconnaissance	First: AFA (75) for forward oblique photography, AFA (75) for panoramic photography, IR line scanner Second: Two AFA's are installed for vertical and oblique photography with overlap in place of one AFA for panoramic photography	234x41 / 120	-	Pod designed for maximum speed of aircraft platform of Mach 1.4

1. Three numbers in the numerator signify: length x width x height, two signify height x diameter.
2. Here and further on, the lens focal length in millimeters is given in parentheses.

WESTERN MINE WARFARE IN MEDITERRANEAN DISCUSSED

Moscow ZARUBEZHNOYE VOYENNOYE OBOZRENIYE in Russian No 12, Dec 83 (signed to press 15 Dec 83) pp 67-70

[Article by Capt-Lt A. Kolpakov and Capt-Lt V. Sidorenkov: "Employment of Mine Ordnance in the Mediterranean"]

[Text] The Mediterranean, which connects Europe, Asia, Africa and the Atlantic and Indian oceans, holds an important place in the militaristic plans of the Pentagon and U.S. allies in the aggressive NATO bloc. It is the chief element of the South European TVD [theater of military operations], which is viewed as one of the primary springboards for conducting war against the USSR and other countries of the socialist community and as a very important support base for a struggle against the national liberation movement in the Near East. The considerable stretch of coastline and the scattered nature of ground territories of this theater are the primary factors determining the special importance of naval forces in the bloc's system of armed forces in this region. The presence of a far-flung network of VMB [naval bases], basing points and ports located in geographically advantageous regions creates favorable conditions for their basing and deployment as well as for conducting combat actions.

Foreign military specialists believe that combat actions at sea will assume broad scope and will be conducted on the water, under the water and in the air with the use both of conventional and nuclear weapons and will bear an offensive or defensive character.

As emphasized in the western press, mines are one of the effective means of warfare which will permit creating operating conditions favoring one's own side in a particular part of the Mediterranean, will force the enemy to expend major resources for antimine defense and, in addition, will exert a strong psychological effect on him.

According to foreign press reports, it is planned to employ mine ordnance in accomplishment of the following primary missions by NATO's attack and joint naval forces in the TVD: winning and maintaining sea supremacy, disrupting enemy lines of communication, blockading the Black Sea straits, establishing

control over the Strait of Gibraltar, covering friendly lines of communication, VMB's and ports, and strengthening the coast's antilanding defense. Aviation, submarines and surface ships from the fleets of Turkey, Greece, Italy, France, Spain, Great Britain and the United States (the Sixth Fleet) will be used for minelaying.

It is planned to use mines in offensive and defensive fields intended for a lengthy period of time, as well as in tactical fields for the short-term effect on the enemy in conducting some operations. Active minefields are to be laid primarily by aviation and submarines in enemy-controlled waters, on possible deployment routes of enemy ship groupings and transit routes of landing detachments and convoys in the form of barriers, and in locations of likely anchorages in the form of groups of mines. Defensive fields are to be laid by surface ships in waters controlled by friendly forces (primarily on approaches to coastal sectors, VMB's and ports accessible for landing, and in strait zones). Minelaying may be performed both in advance, before combat actions begin, and in the course of a war.

NATO military specialists emphasize that the nature of employment of mine ordnance in the Mediterranean will have specific features by virtue of the Mediterranean's special physical geography conditions.

The Mediterranean occupies an area of 2.5 million km^2. It stretches 3,900 km from west to east, up to 1,800 km from north to south, and the predominant depths are 2,400-3,600 m (with maximum depth of 5,121 m). It is divided into seas by straits, narrows, islands, archipelagos and bends in the coastline, with the most well-known seas being the Ligurian, Tyrrhenian, Ionian, Adriatic and Aegean seas. The foreign press notes that the central and southern parts of the Aegean Sea, Strait of Gibraltar, Strait of Tunis, Black Sea straits and approaches to coastal sectors, VMB's and ports accessible for landings are considered probable minelaying areas (see diagram [diagram not reproduced]).

The key positions of the South European TVD which are of strategic importance, in the estimate of the bloc command, are the zones of the Strait of Gibraltar, Black Sea straits and Central Mediterranean. Maintaining control over them assumes the conduct of a set of measures to prevent the penetration of enemy submarines from the Atlantic to the Mediterranean and departure of enemy ships from the Black Sea, as well as a blockade of straits in the Central Mediterranean.

The Strait of Gibraltar is an important node of sea lines of communication linking the Mediterranean with the Atlantic Ocean. It is 65 km long and 14 km at its narrowest point. The strait's depths (338-1,181 m in the channel) permit modern anchored mines to be placed. The foreign press has noted that there is a detailed plan for blockading it codenamed "Fortress Gate," the basic points of which are practiced regularly in NATO joint naval force exercises of the Test Gate type. More than 20 ships and auxiliary vessels and over 20 aircraft and helicopters from the NATO OVS [Joint Armed Forces] in the Iberian Atlantic and NATO naval attack forces in the Mediterranean can be used for minelaying.

The strait zone of the Central Mediterranean includes the Tunis, Messina and Malta straits. The Strait of Tunis is a natural passage between the Mediterranean's eastern and western basins. Its narrowest sector, located between the island of Sicily and Cape Bone on the African coast has a width of some 140 km and depths of 50-570 m. It is believed that the greater part of the strait can be mined. The Strait of Messina (with a minimum width of 2.5 km) is a supplementary bypass route on the path from the western part of the sea into the eastern part. The depths of from 80 to 400 m permit the laying of bottom and anchored mines. The Malta Strait with depths of 50-150 m also can be blockaded by these mines. According to the western press, minelaying will be performed here chiefly by surface combatants and aircraft of the Italian Navy as well as by carrier-based aircraft of the U.S. Sixth Fleet.

The Adriatic Sea is considered the most suitable for minelaying among seas of the Central Mediterranean basin. Minefields here can be laid in its shallow northern portion (with depths of 30-170 m) and on approaches to VMB's and ports.

In the opinion of foreign specialists, the geographic conditions of the Eastern Mediterranean favor the accomplishment of naval operations to limit the maneuver of enemy forces and to destroy them. Such actions are planned at the egress from the Black Sea and in the vicinity of the Aegean Archipelago as well as on approaches to the Suez Canal.

The Black Sea strait zone includes the Bosporus, Dardanelles, and the Sea of Marmara located between them. It has a total length of some 300 km; the Bosporus has a length of 30 km and a width of 0.7-3.3 km; depths in the middle of the strait are 27.5-121 m and they often are 10 m near the very shore, and shoals, sandbars and banks are encountered at times (for example, opposite Buyukdere and Uskudar). The Sea of Marmara has the shape of an ellipse, stretching more than 200 km from west to east and up to 85 km from north to south. It is deep, with a depth of 1,200 m near the Princes Islands north of the Kapidagi Peninsula, 50-100 m deep in the southern part, and 30-50 m deep in front of the entrance to the Dardanelles. The latter (with a length of more than 60 km and a width of 1.3-7 km) connects the Sea of Marmara with the Aegean Sea, with a channel 53-106 m deep passing through it.

The NATO command plans to blockade the Black Sea straits primarily with naval forces of Turkey and Greece, with the possible inclusion of the American fleet in case of a threat of their capture. In the opinion of the NATO command, the positioning of the VMB's of these countries permits keeping not only the immediate strait zone under control, but also the distant approaches to it. Mine ordnance will find wide use in blockade operations. It is believed that it must be used simultaneously in the strait and prestrait zones and in several important but relatively limited areas to keep out enemy naval forces under all conditions and from different directions. Minefields will be laid in stages (initially in the Bosporus, then in the Sea of Marmara and the Dardanelles) and will be screened by shore artillery batteries deployed at favorable positions.

According to foreign specialists' estimates, the naval forces of Turkey and Greece are capable of deploying more than 50 percent of their naval order of battle (some 100 combatants, including nine minelayers and 20 land-based patrol aircraft) for laying mines in the strait zone. If necessary, their actions will be supported by NATO naval attack forces in the Mediterranean. Almost all Turkish and Greek ships can take mines aboard, which permits performing minelaying rather flexibly and rapidly. The basing points of minesweepers, minelayers and netlayers of the Turkish Navy are in the vicinity of Beykoz. Here, as well as in the Dardanelles (Canakkale), there are depots of mines and of nets and booms. The positioning of mine ordnance depots in the immediate vicinity of probable mining areas permits the minelayers and other supply ships to be dispersed at storage points, the mines can be quickly received, and they can be laid in a short period of time.

According to estimates of the NATO command, a blockade of the Black Sea straits makes it possible to win time and strengthen the friendly grouping by moving reinforcing forces by sea from other TVD's and by maneuvering forces within the Mediterranean.

Defense of the strait zone is practiced constantly in various exercises by the Turkish Armed Forces and the bloc OVS. In NATO exercises held in recent years such as Deep Furrow, South Express, Marmara Express, Adventure Express and others, the objective was to practice reinforcing the grouping of ground forces of member nations in the zone of the Black Sea straits.

With the exception of coastal sectors and approaches to ports, depths of the Aegean Sea (an average of 400-600 m) do not allow laying bottom influence mines, but permit laying anchored mines. Ships and aircraft of the Greek and Turkish naval forces and carrier-based aviation of the American Sixth Fleet can be used to lay minefields.

The Suez Canal is of great strategic importance in the Eastern Mediterranean. It is the eastern entrance to the Mediterranean and part of the shortest sea route between Europe and the Far East. In case of war the canal can be blockaded by mines very easily, which was done during World War II (on 30 January 1941 German aircraft laid 11 bottom influence mines on which four ships blew up) as well as during Israeli aggression in the Near East in 1956 and 1967.

The experience of the two world wars indicates the possibility of mining the Mediterranean. While approximately 26,000 mines were laid here during World War I, there were 100,000 mines laid during World War II.

In planning the active use of mines when conducting combat actions in this region, the military-political leadership of the North Atlantic Alliance allocates considerable funds for their development and production. As reported in the foreign press, the Turkish, Greek, Italian and Spanish navies primarily have American mines of obsolete models: Mk 25, Mk 18, Mk 27, Mk 36, Mk 52, Mk 55, Mk 56 and others. In recent years mines of their own designs have been under intensive development and already are being series-produced. In particular, Italy developed the MR-80 and VS SM600 influence seabed mines. The French Navy has the MCT 15, MCC 23C and TSM 3510 influence seabed mines. The

U.S. Navy is testing the Quickstrike bottom mine and IWDM rocket-propelled surfacing mine, the Captor Mk 60 mine is being perfected, and production of the SLMM mobile mine is being arranged. In addition, development is being conducted of a multicharge antisweep device for protecting fields of moored mines. Particular attention is being given to developing mines which are universal (for carriers), improving their sweeping stability and increasing their period of normal functioning after being laid.

In planning the extensive use of mine ordnance in combat actions in the Mediterranean, the NATO command at the same time attaches great importance to developing mine platforms. It is planned to use not only forces from the navies and air forces of Turkey, Greece, Italy and the U.S. Sixth Fleet, but also of Spain, France and Great Britain for minelaying. This includes land-based patrol aircraft adapted for laying mines (the American Orion, the British Nimrod, the Italian Atlantic, the Spanish and Greek Albatros, and the Italian and Turkish Tracker) and carrier-based aircraft (the American Intruder, Corsair and Viking), as well as B-52 strategic bombers of the U.S. Air Force. In addition, it is planned to use U.S. C-130 military transport aircraft for minelaying after a certain amount of refitting. Merchant vessels refitted as minelayers also can be used on a wide scale for these same purposes.

The Mediterranean is well equipped in the navigational sense. Its radiotechnical facilities (radio beacons and radar systems), coastmarks and floating seamarks make it possible to accomplish minelaying with high precision even in bad weather conditions.

The NATO naval command is giving much attention to developing uniform tactics for using mines. It is reported that a special working group has been set up in this connection to develop general principles for employing mine ordnance in sea TVD's. In addition, these matters are being resolved during numerous exercises of national navies and bloc naval forces, including Display Determination, Open Gate, Test Gate, Damsel Fair, Dawn Patrol, Olive Noire, Deterrent Force, Deep Furrow and others.

All this indicates the firm intent of NATO bosses to make active use of mine ordnance during combat actions in the Mediterranean.

6904
CSO: 1801/175

U.S. NAVAL AVIATION SEARCH AND RESCUE SERVICE

Moscow ZARUBEZHNOYE VOYENNOYE OBOZRENIYE in Russian No 12, Dec 83 (signed to press 15 Dec 83) pp 73-76

[Article by Col M. Panin]

[Text] An important place is set aside for naval aviation in plans of U.S. leading circles for aggressive military preparations, and it is called upon to accomplish the following missions: deliver missile and bomb strikes (including nuclear) against enemy ships, VMB's [naval bases] and other targets; participate in winning and maintaining sea supremacy and air superiority in areas of combat operations; combat submarines; screen ship forces in the sea passage; provide close air support to ground forces and landing forces; conduct reconnaissance; and conduct search and rescue operations.

In the opinion of Pentagon specialists, naval aviation is in a high state of combat readiness, and a further improvement in such readiness depends not only on the outfitting of units and subunits with modern military equipment and weapons, but also on their manning with well-trained personnel and on the precisely adjusted organization of the service for search and rescue of crews of aircraft and helicopters which have been downed or have crashed. The foreign press emphasizes that it is more advantageous to conduct a rescue operation and thus keep an experienced pilot in formation than to train an equivalent replacement.

In analyzing the participation of naval aviation in wars (World War II, in Korea and in Vietnam) and numerous exercises, American specialists note that the naval aviation search and rescue (SAR) service has gained considerable experience in rescuing flight personnel and that on the whole it is meeting the demands placed on it.

According to foreign press reports, the SAR includes five special helicopter rescue squadrons: three on the Pacific coast, one on the Atlantic coast and one on the coast of the Gulf of Mexico. Each of them has 20 or more helicopters of various types (Sea King, Sea Knight, Iroquois).

In addition to T/O&E rescue helicopters, practically all helicopters and land-based patrol aircraft of naval aviation (whose crews undergo appropriate preparations during training) are used to accomplish search and rescue missions.

As the western press notes, land-based helicopter squadrons as well as land-based patrol aircraft squadrons which are on around-the-clock duty in a rescue variant have two crews each (primary and reserve), with a five-minute readiness of the primary crew for take-off. In addition, 2-3 rescue helicopters placed at the commander's disposal from search and rescue squadrons are constantly on duty aboard every aircraft carrier at sea. During flights of deck-based aircraft, one rescue helicopter is in the air on the starboard side of the ship abeam her island superstructure, a second is in five-minute readiness for lift-off, and a third is in reserve.

American military specialists believe that rescue helicopter crews have gained sufficient practice in rescuing ejected pilots, seamen overboard, and passengers of vessels which have been stricken in the vicinity both of the U.S. Atlantic and Pacific coasts as well as near numerous military bases on foreign territories. For example, one SAR squadron saved 1,500 persons in ten years, and another saved 200 in five years.

The foreign press has emphasized that the average time for returning a person who has fallen overboard to the ship is 10-12 minutes, while the record time for lifting a pilot onto a carrier after an unsuccessful take-off of the aircraft and its fall into the water is 4.5 minutes.

It is reported, with respect to land-based patrol aircraft, that while patrolling in various parts of the ocean they incidentally accomplish search and rescue missions for victims by vectoring ships and vessels to them and dropping emergency rescue pods on parachutes.

The Sea Knight (Fig. 1 [figure not reproduced]) is the basic helicopter of the rescue squadrons. It has a crew of four, including one rescue swimmer. In addition to T/O&E on-board equipment, it has emergency radio transmitters, rescue pods with inflatable rafts and reserves of food, water, drugs and clothing which are dropped to victims, as well as various hoists. A conventional sling ("collar"), an aluminum seat with three cross pieces (it can lift three persons simultaneously), a net and a floating stretcher of the cradle type (for wounded) are used for hoisting victims directly aboard the helicopter.

In special instances the helicopter can land on the water in a dead calm. The helicopter's electronic equipment also permits flying to the beacon of a pilot's portable emergency radio.

The crew conducts a visual lookout of the water's surface in a given area. As stressed in the foreign press, the United States has been conducting studies since 1976 into the possibility of using pigeons for searching for people and objects at sea. It is generally known that the vision of pigeons is considerably keener than that of humans. It is reported that birds (three per helicopter) trained to react to red, orange and yellow colors and accustomed to noise and vibration were placed in special chambers (each in a separate chamber with a 120° sector of observation) mounted beneath the craft's fuselage in the nose portion. On detecting a buoy of the appropriate color the pigeon would peck a key, resulting in the closing of an electrical circuit, an

audible signal would be given and a light would go on on the instrument panel indicating the sector in which the color was noticed. Then the pilot would turn the helicopter and the crew would perform a thorough search. The bird would continue to "signal" as long as it saw the buoy. It is noted that in 77 percent of the cases the pigeons detected floating objects before the helicopter crew.

Based on results of practical tests, American specialists concluded that pigeons are more effective than humans in searching for small objects of a certain color at sea. Therefore, work in this direction is continuing.

Rescue swimmers have been included in helicopter crews to give immediate help to victims. It is believed that as a rule persons who are suffering from the inevitable traumas, shock and loss of energy cannot secure themselves on the hoisting device on their own to be lifted into the helicopter. In this regard the rescue swimmer leaps into the water without fail (from a height of 3-4.5 m and a helicopter speed of around 16 km/hr) regardless of how active the victim is in the water, frees him from the parachute, inserts him in the "collar" (or places him on the cradle-type stretcher) and fastens the victim to himself, then both are lifted into the helicopter with the hoisting gear. This is done to avoid cases where the person being rescued falls back into the sea.

Rescue teams are manned from among graduates of a school for rescue swimmers who previously completed a candidate's school for the training of flight crews. Along with an excellent mastery of rescue techniques, they must be able to give first aid and restore a victim's cardiopulmonary function with the help of a special medical kit aboard the helicopter. All swimmers are given a control test yearly (a theoretical test in an exam and a practical test at sea).

A school for training rescue swimmers is in operation at Jacksonville Naval Air Station. It has a small staff of one officer and eight instructors. The training program is four weeks long (160 training hours, of which 90 hours are set aside for practical classes). After completing the school graduates receive certification as "rescue swimmers/helicopter crew members" and are sent to search and rescue squadrons. There were 490 persons trained here over the last four years.

Responsible for the organization of the search and rescue service in naval aviation is its chief, whose headquarters is at Pensacola Naval Air Station. He also is responsible for accomplishment and constant updating of the search and rescue program functioning in naval aviation, which includes a wide range of problems from personnel training to testing new rescue gear.

The SAR headquarters gives particular attention to standardization of the SAR program. Corresponding documentation is drawn up for this purpose which provides for unified actions of aircraft and helicopter crews. For example, the "Manual for Search and Rescue in the Navy" was prepared in 1981 with detailed instructions to all units and subunits performing rescue missions. Later the "On-Board Reference for Search and Rescue" was compiled for helicopter crews.

As noted in the American press, a guarantee for successful performance of search and rescue operations is not only their precise organization, but also the extent of preparedness of the pilots themselves for survival in the water. It is emphasized that each crew member must be confident that if he has to abandon an aircraft over the sea he will be able to survive until helped.

There is a program in naval aviation for training flight personnel to survive in the water. It is aimed at teaching crews the principles of swimming in difficult hydrometeorological conditions, instilling skills of survival in various situations and conditions as well as handling rescue gear, and at developing confidence in the ability to survive. Training in this program is conducted in naval aviation training command schools, at air bases and in combat squadrons. At North Island Naval Air Station, in particular, special two-day courses are in operation to teach flight personnel to survive at sea. The teachers are experienced instructors who have gone through the war in Vietnam. Up to 40 persons sent from combat squadrons are trained here weekly.

Much attention is given to survival practices by crews of aircraft and helicopters, organized by unit and force [soyedineniye] staffs. Particular emphasis is placed on the use of simulators.

According to western press reports, all U.S. naval and marine air stations are equipped with simulators of various types, including single-place and multiplace trainers simulating losses of spatial orientation; a parachute trainer for practicing the landing on the water and getting out of a parachute in the water; an underwater multiplace simulator for teaching how to get out of a helicopter overturned in the water; a simulator for teaching how to get out of an aircraft cockpit beneath the water; and an ejection simulator.

The underwater multiplace trainer is of greatest interest. According to American press data, from July 1963 through February 1975 234 helicopters with some 1,100 persons aboard including the crews fell into the water or made a forced landing on it. It is emphasized that almost half of those persons who managed to survive left the craft beneath the water. This is why special significance is attached to holding such practices.

This simulator, which is a mock-up of a helicopter cabin, is designed for simultaneous participation of six persons in the practice. It is suspended at a height of 1-2 m above the water, then dropped into the water. The cabin fills with water on submerging and turns about its longitudinal axis. Skin-divers who maintain constant communications with the practice director are a back-up for personnel emerging from the cabin.

The trainer for teaching how to get out of an aircraft cockpit under the water (Fig. 2 [figure not reproduced]) is considered to be an effective means for teaching naval aviation flight personnel to survive. Classes in the trainer are mandatory for every pilot and navigator. The trainer simulates an aircraft cockpit and rolls down guide rails into a pool of water. During the practice the pilot has to release himself from seatbelts and the parachute harness and make his way to the surface. In the estimate of the naval

aviation command, there is a 91.5 percent probability that persons who have undergone training in the simulator will successfully get out of an aircraft which has fallen into the water, and there is only a 66 percent probability for others.

At the present time the United States is developing a comprehensive system of practices to increase the flight personnel's degree of preparedness to survive in emergency situations. The foreign press emphasizes that one of its features is that each aircraft or helicopter crew member must make a parachute jump into the water from a height of 150-180 m and perform necessary survival actions, and then he is hoisted from the water by a rescue helicopter.

That in basic terms is the organization of the U.S. naval aviation search and rescue service.

6904
CSO: 1801/175

LOS ANGELES CLASS NUCLEAR-POWERED SUBMARINES

Moscow ZARUBEZHNOYE VOYENNOYE OBOZRENIYE in Russian No 12, Dec 83 (signed to press 15 Dec 83) pp 76-78

[Article by F. Sagaydakov]

[Text] The U.S. military-political leadership is spending large sums for building nuclear-powered submarines in intensively stepping up the arms race. In late 1971 the American firm of Newport News Shipbuilding and Drydock developed the draft of a multipurpose submarine, the "Los Angeles" (see color insert [insert not reproduced]). As the foreign press reports, it is intended to accomplish the following missions: combating enemy submarines and surface combatants; protecting SSBN's [strategic missile submarines] and attack carrier forces; protecting sea and ocean lines of communication; and laying mines. After such submarines are fitted with long-range cruise missiles (with conventional or nuclear warheads) they will be able to deliver strikes against shore targets.

The lead submarine was laid down in January 1972 and was commissioned in November 1976. In early 1983 the U.S. Navy had 20 submarines and funds had been appropriated for building another 21, of which 15 are in various stages of construction. It is noted that at the present time one nuclear-powered submarine [SSN] costs $800 million.

Under the five-year shipbuilding program (fiscal years 1984-1988) it is planned to make appropriations for another 21 SSN's (3 in 1984, 4 in 1985, 4 in 1986, 5 in 1987 and 5 in 1988).

The basic technical specifications of the "Los Angeles" Class SSN's are given below.

Displacement, tons:	
Surface	6,000
Submerged	6,900
Main dimensions, m:	
Length	109.7
Width	10.1
Draft	9.9

Output of Nuclear Propulsion Plant, hp..... 35,000
Full Submerged Speed, knots..... 32-35
Diving Depth, m..... 450
Crew:
Officers..... 12
Enlisted Men..... 115

In developing the "Los Angeles" Class nuclear-powered submarines great attention was given to their outfitting with effective weaponry. The submarine has four torpedo tubes to fire the Mk 48 torpedoes, SUBROC antisubmarine missiles, the Harpoon antiship UR's [guided missiles], the Tomahawk KR's [cruise missiles], and to launch the Mk 30 simulators. They also can be employed to lay Mk 57 mines (see table).

Basic Technical Specifications of Weaponry of "Los Angeles" Class SSN's

Characteristics	Mk 48 Torpedo	SUBROC Antiship Missile	Antiship Missiles		Mines	
			Harpoon	Tomahawk	Mk 57	Mk 67
Weight, kg:						
Overall	1,600	1,853	667	1,400	930	754
Explosives	.	.	225	454	154	.
Dimensions, m:						
Length	5.8	6.25	4.6	6.4	3	4
Diameter	0.533	0.34	0.53	0.53	0.5	0.5
Speed, Mach	50 (knots)	1	0.85	0.7	-	-
Range of fire, km	46	50	110	500	-	-
Laying depth, m	-	-	-	-	350	100
Guidance system	By wire and acoustic active-passive	Inertial	Inertial and active radar	Inertial with radio altimeter and active radar	-	.

The vertical launch system for the Tomahawk KR for installation aboard the "Los Angeles" Class SSN as well as a project for modernizing this submarine which provides for accommodating 12 vertical PU's [launchers] in the vicinity of the bow main ballast tank outside the pressure hull, has been under development since 1981. According to foreign press reports, this should not reduce the effectiveness of combating submarines inasmuch as firing will not be conducted from torpedo tubes, nor will it cause significant changes in hull designs or affect running qualities.

It is planned that the vertical PU's will be installed aboard the "Los Angeles" Class submarine with hull number SSN 719 in 1985 after her commissioning. Beginning with SSN 723 all submarines will be fitted with 12 vertical PU's in the process of their construction, and SSN's 688-718 will be fitted with such launchers during their major overhaul.

The "Los Angeles" SSN has a single-hull architecture for the greater part of her length and, in contrast to all previous series, does not have a

double-hull design in the area of the auxiliary machinery compartment. Reserve buoyancy is 15 percent. The standard displacement of the "Los Angeles" is 2,400 tons greater than, for example, the "Sturgeon," which is explained by the installation of a more powerful nuclear propulsion plant (YaEU) and new electronic equipment, an increase in battle reserve and by other factors. Hull structures are made of HY-80/100 steel with a lower yield limit of 70 kg/mm^2. The hull is a cylindrical shell ending at stern and bow in cones with hemispherical apices. Four torpedo tubes pass through the bow cone at an angle to the longitudinal central plane. The pressure hull is divided into three compartments by transverse bulkheads: central, reactor and turbine (Fig. 1).

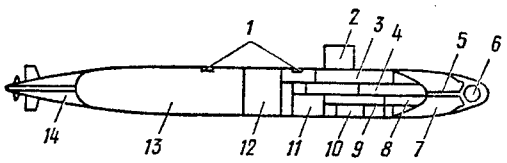


Fig. 1. Diagram of "Los Angeles" Class SSN:
1. Lifeboats
2. Mast fairwater
3. Plotting room
4. Crew quarters
5. Access tunnel to bow sonar antenna
6. AN/BQQ-5 bow antenna system
7. Main ballast tank
8. Torpedo room
9. Spare torpedo room
10. Storage battery
11. Auxiliary machinery room
12. Reactor compartment
13. Steam-turbine plant compartment
14. Main ballast tank

The first compartment is divided by three decks. The plotting room is accommodated on its upper deck, crew living quarters on the second deck, torpedo and spare torpedo rooms on the third deck, and the storage battery and tanks in the hold. The stern portion has spaces for auxiliary machinery and tanks. The second compartment contains the steam-generating plant with the S6G reactor, and the third compartment holds the steam-turbine plant and other machinery.

According to foreign press data, much attention was given to reducing noise in designing the SSN. A geared-turbine installation consisting of a steam-generating plant, standard in make-up for all series-produced nuclear submarines and consisting of a steam-generating plant with the S6G reactor and two turbines rotating a seven-blade propeller through a reduction gear, is used as the YaEU. The reactor was developed by the firm of General Electric. In comparison with the previously used S5W* series-produced reactors of the Westinghouse firm, it can transmit to the shaft more than double the power and has a greater percentage of natural primary coolant circulation. This permits increasing the reliability and decreasing noise by eliminating high-capacity pumps and it simplifies the electrical equipment and monitoring gear. Its service life between refuelings is around ten years.

Installed in the SSN is an advanced CAMS-11 air composition analysis and control system using a mass spectrometer, controllable EVM [electronic computer] (programmed for various gas compositions of air within the compartment), as well as infrared sensor-analyzers of carbon dioxide content. According to its developers' concept, the system should provide a normal atmospheric composition in compartments for 90 days. It was proposed to develop the CAMS-11B

*It has the modifications S5WA and S5W-2.

system based on it, which was to automatically monitor and control all ventilation and regeneration facilities. The EVM regulates oxygen content in submarine compartments by directly acting on the oxygen plant, scrubber operation, and temperature conditions for the hydrogen and carbon monoxide combustion plant, and it monitors the condition of the wood charcoal filters.

Much attention was given to developing highly efficient electronics in creating the "Los Angeles" Class SSN's. They include in particular the AN/BQQ-5 sonar complex made on the basis of the AN/BQQ-2, which includes the AN/BQS-13 spherical antenna (with a diameter of 4.57 m), a conformal sound-location GAS [sonar], towed antenna accommodated in a housing on the submarine hull (Fig. 2 [figure not reproduced]), and other sonar systems. It is served by four operators.

Installed aboard "Los Angeles" Class SSN's is a special MINI SINS navigational complex, AN/BPS-15 radar, AN/WSC-3 satellite communications station, AN/BQS-15 mine-detection GAS, AN/UYK-7 EVM, Mk 117 fire control system and other electronic equipment.

In the opinion of American military specialists, further improvement in the "Los Angeles" Class nuclear submarine will follow the path of an improvement in electronic equipment on the basis of a unified command and control system, with which both submarines under construction and future submarines will be equipped.

The AN/USQ-82(V) shipboard multiplex data transmission system is being developed. It will permit bringing together data coming from weapon and situation coverage systems as well as from general ship systems and transmitting them over multiplex cable. It is to be installed aboard "Los Angeles" Class SSN's beginning with number SSN 751. The foreign press reports that in the late 1980's and early 1990's the system will be perfected along the lines of extensive use of distributed data processing, standard modules and fiber optics, which will substantially improve the reliability of cables and will permit data converters to be eliminated from the equipment.

6904
CSO: 1801/175

DESIGN FEATURES OF CHESTER W. NIMITZ NUCLEAR-POWERED AIRCRAFT CARRIER

Moscow ZARUBEZHNOYE VOYENNOYE OBOZRENIYE in Russian No 12, Dec 83 (signed to press 15 Dec 83) pp 79-80

[Article by Capt 1st Rank (Res) A. Ivanitskiy; passages rendered in all capital letters printed in boldface in source]

[Text] The American nuclear-powered aircraft carrier "Chester W. Nimitz" (commissioned in 1975) is the largest combatant of the navies of capitalist countries (Fig. 1 [figure not reproduced]). She has a full-load displacement of 91,500 tons, a length of 332 m, hull width of 40.8 m, flight deck width of 76.8 m, a draft of 11.3 m, and full speed of around 30 knots. The U.S. Navy has another two aircraft carriers of this class, the "Dwight D. Eisenhower" (commissioned in 1977) and the "Carl Vinson" (1982). A fourth, the "Theodore Roosevelt," was laid down in late 1980. Plans are to build another two such ships before the beginning of the 1990's.

The nuclear-powered carrier "Nimitz" has a number of features: The hull is welded out of steel plates and the main supporting structures including the flight deck are made of armor steel. To build her, it took some 62,000 tons of steel and 1,800 tons of light aluminum alloys, which were used to make the flying bridges, secondary enclosures and bulkheads, ventilation ducts and other arrangements.

A typical feature of the ship's lines is the broad aft end with flat, rounded transom and a forward end with a bulbous shape and with sharp lines in the area of the design waterline which help improve the carrier's running qualities. The foreign press reports that although the transom stern degrades running characteristics, it was chosen for a more rational placement of the propeller and rudder system and for providing the given stability. An angular flight deck was installed on the "Nimitz," with lateral overhanging sections supported by prominently developed sponsons. The carrier's decks and platforms are shown in Fig. 2.

The FLIGHT DECK is one of the ship's primary elements, determining both her architectural type and the capabilities of technical aviation means accommodated aboard her. The flight deck is divided into take-off, landing and

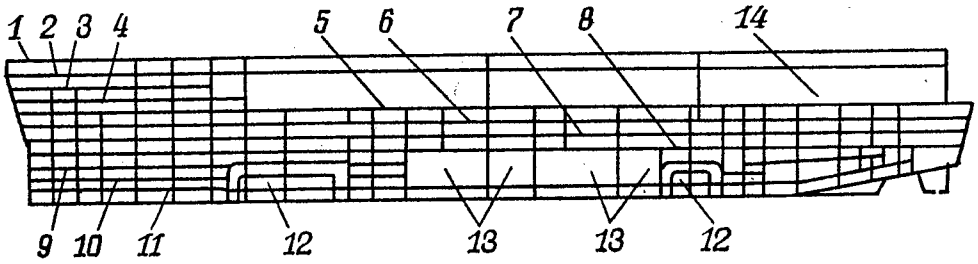


Fig. 2. Inboard profile of carrier's hull:

1. Flight deck
2. Gallery deck
3. Second intermediate deck
4. First intermediate deck
5. Main (hangar) deck
6. Second deck
7. Third deck
8. Fourth deck
9. First platform deck
10. Second platform deck
11. Bilge deck
12. Aviation fuel tanks
13. Autonomous bow and stern GEU [main power plant] levels
14. Hangar

parking sections fitted with corresponding systems and means for the preparation, servicing and employment of aircraft. In some cases the sections are combined because of limited size of the flight deck.

The TAKE-OFF SECTION has four steam-powered catapults (weighing some 180 tons and up to 100 m long) which support the take-off of aircraft weighing up to 43 tons at a speed of around 300 km/hr. Deflectors are used to protect people and aircraft preparing for take-off from effects of the jet engine gas streams. There are deck panels located between the catapult and deflector which are cooled by outside water, which maintains a normal temperature of the deck surface while personnel are working to tie down and service the next aircraft at the start.

The LANDING STRIP in turn also consists of three sections: stern section (55 m long) from the stern break of the flight deck to the arresting lines of the arresting gear; the arresting lines (here they are located 12 m from each other and there is an arresting barrier); and an arresting section (from the last arresting line to the bow break of the landing deck).

The landing deck is marked by two continuous white lines on the sides and its center line is marked with a yellow and white dotted line.

The PARKING SECTION is that portion of the flight deck on which aircraft are placed while take-off and landing operations are under way. It is marked in white and red dotted lines. Located here are the aircraft elevators, ammunition supply lifts, aviation fuel pumps, two escalators for personnel to ascend to the flight deck, as well as stations supplying the aircraft with electrical power, compressed air, oxygen, nitrogen and so on.

The GALLERY DECK serves to reinforce the flight deck and its lateral overhanging sections. In addition, the rational use of spaces beneath it permits

organizing a stanchionless hangar here with double-layer protection. Accommodated on this deck are the BIP [combat information center], a complex of command and flag officer spaces, control posts for the technical aviation facilities, and personnel cabins and bunk rooms. The gallery deck connects with the upper deck through catwalk bridges and in addition it has a through passage from bow to stern.

INTERMEDIATE DECKS. In connection with the fact that the hangar takes up three between-decks spaces in height, there are two intermediate decks in the bow portion (outside the hangar) between the gallery and hangar decks, where the catapult machinery, a platform for crew boats and life rafts, shops, storerooms, cabins and bunk rooms are located.

The MAIN (HANGAR) DECK. Its greater part is taken up with a hangar 8 m high intended for the accommodation, servicing and repair of aircraft. It occupies more than 60 percent of the main deck area. To localize possible centers of fire the hangar can be pressurized and divided into three self-contained compartments by fire-resistant curtains which under normal conditions are raised and are kept beneath the deck head. In addition, this deck is fitted with sprinkler and foam-generation firefighting systems.

The SECOND AND THIRD DECKS. They accommodate the machinery of aircraft elevators, medical and dental spaces, bunk rooms for enlisted personnel as well as the personnel messes, which under combat conditions can be used for assembling aviation ammunition.

The FOURTH AND BILGE DECKS, FIRST AND SECOND PLATFORM DECKS. Auxiliary machinery, a power and damage control station, and stores for aviation property, ZIP [spare parts, instruments and accessories] and dry provisions primarily are concentrated on the fourth deck.

The bilge deck contains auxiliary machinery, various stores, ammunition magazines and inset tanks of aviation fuel. The platform decks accommodate stores of aviation property, freezing and refrigerating rooms and so on.

The AUTONOMOUS LEVELS (bow and stern) accommodate the main power plant with a total output of 260,000 hp. Each level has a compartment with a water-moderated, water-cooled reactor, steam-generating plant, auxiliary machinery and control stations, as well as an engine room with two geared-turbine units.

It is believed that the location of the main power plant assures its rather high resistance to damage.

The carrier SUPERSTRUCTURE (island) is a small, seven-story structure located on the starboard side. Because the necessary radar and radio antennas could not be accommodated on the superstructure, a supplementary mast was set up behind it.

The island contains the flag command post; pilot, operations and navigation rooms; flight control station, radar and radio communications stations;

aircraft and helicopter maintenance center; recognition systems; as well as sea cabins for the commanding officer and flag officer.

The MAGAZINES for aviation ammunition, located below the waterline in the bow and stern groups, are fitted with equipment which allows receiving bombs, rockets and other aviation ammunition varying in size and design.

All battle stations and all living and working spaces are served by a conditioning system which maintains a temperature of 23°C and a 50 percent humidity.

The design protection of the carrier "Nimitz" includes abovewater and underwater lateral protection. The former consists of armor decks (flight, hangar and third decks) as well as the hangar's armored longitudinal bulkheads, and the latter consists of longitudinal and transverse bulkheads. The compartments they form are filled with water, fuel or porous filler alternately.

The lateral underwater protection takes in the areas of the reactor compartments, ammunition magazines and aviation fuel storage. It reaches the third deck and protects the ship from the side against contact detonations of torpedoes, antiship missiles and artillery projectiles. The carrier is protected on the bottom by armored plating with watertight integrity and by armored transverse bulkheads.

6904
CSO: 1801/175

BRITISH NAVY SATELLITE NAVIGATION EQUIPMENT

Moscow ZARUBEZHNOYE VOYENNOYE OBOZRENIYE in Russian No 12, Dec 83 (signed to press 15 Dec 83) pp 81-83

[Article by Capt 3d Rank M. Karelin: "British Navy Shipboard Satellite Navigation Equipment"; passages rendered in all capital letters printed in boldface in source]

[Text] The military-political leadership of Great Britain views the Navy as one of the most important tools for implementing its aggressive plans. The belief is that successful employment of the Navy, especially in remote areas of combat actions, is impossible without appropriate navigational support.

At the present time, satellite navigational equipment (SNA) both of American and British manufacture is operational aboard submarines and surface combatants of the Navy.

SUBMARINES (nuclear and diesel) have been fitted with the MX-1105RN-S/M SNA since 1981. This is a modification of the series-produced MX-1105 equipment (of the American Magnavox firm), which produces current elements of fix based on data of the NNSS satellite navigational system (SNS) (Transit) and the Omega RNS [radio navigation system]. This equipment makes use of the advantages of both navigational systems (the high precision of the former and the continuous operating mode of the latter). In addition, their primary deficiencies are eliminated: The discreteness of observations on the SNS (up to two hours depending on the ship's latitude and the number and position of the satellites) and poor accuracy of observations for the Omega RNS (up to 3-4 nm depending on time of day) as a result of major errors in corrections for propagation velocity of the radio waves. Use of the MX-1105 equipment aboard submarines is determined by the fact that the reception of Omega RNS signals by a towed paravane antenna is possible in a submerged condition and observation of the SNS are performed when the submarine is in a surface condition or at periscope depth.

The MX-1105 (see figure [figure not reproduced]) consists of a main unit which includes a single-channel receiver for the SNS signals, a three-channel receiver of RNS signals, EVM [electronic computer] for processing navigational data, EVM for controlling the operation of the RNS

signal receiver, display and controls; and two antennas (one with preamplification of SNS signals and the other with preamplification of the Omega RNS signals). Equipment specifications are given below.

Mean square error of SNS observations, m	100 plus 360 per knot of error in considering ship speed during observation
Operating frequency of SNS receiver, MHz	400
Operating frequencies of RNS receiver, kHz	10.2; 11.3; 13.6
Stability of reference frequency generator	$2 \cdot 10^{-9}$ for 24 hours
Display	Cathode ray tube (10 lines of 24 characters each
Size of main unit, mm	432 x 419 x 356
Weight of main unit, kg	34
Maximum cable length from antenna to receiver, m	60
Electrical power (ac):	
Voltage, volts	100/115/230 ±15%
Frequency, Hz	45-440
Rated input, watts	100
Ambient temperature, °C:	
Main unit	0-55
Antenna	From -25 to +70

Two basic operating modes are provided for in the MX-1105 equipment. In the first mode the ship's location is determined based on measurements of the Doppler shift of the radio frequency of a satellite passing through a zone of radio visibility. The measurements last 6-15 minutes depending on the angle of elevation of the satellite's path. If necessary an operator can interrupt the collection of data (such as with a submarine's crash dive), in which case the ship's coordinates will be calculated with lesser precision. An EVM performs navigational calculations. In intervals between observations the ship's path is figured using data coming from the gyrocompass and log. The direction and amount of cumulative drift which can be taken into account in reckoning are developed from a number of consecutive observations.

In the second mode the ship's current elements of fix are determined from Omega RNS data in intervals between observations on the satellite navigation system. Values of coordinates obtained using the RNS are not used for automatic correction of dead-reckoning data and have an informative character. When coordinations are determined from the RNS there is a conversion of corrections taking into account features of radio wave propagation of the

SDV [very-low frequency] band and a final observation of the SNS, the coordinates of which are taken as reference coordinates.

With good observation of the SNS the time and coordinates of reckoning are corrected automatically in both modes. The reasons for a poor observation (no reliable data from the satellite, little information received, interference with Doppler measurements, misclosure is more than 20 nm, and so on) are shown on a display. After analyzing the observation quality an operator can perform a correction of the reckoning manually.

In addition to determining elements of fix, the MX-1105 equipment analyzes radio signals from Omega RNS stations, forecasts the eight upcoming satellite passes in the zone of radio visibility, periodically monitors its own serviceability, and so on.

The development of recommended courses in sailing to a given point is one of the important additional tasks. When proceeding along a route (for example, a lengthy ocean passage) the course and distance to a point whose coordinates have been placed in the EVM are computed by an orthodromic line (a great circle arc), and the recommended gyrocompass course lights up on the display. In following the orthodromic line a ship reduces the time of passage and saves fuel and engine life.

Calculations for passage along the loxodromic line (a line on the Earth's surface intersecting all meridians at the same angle) are used when operating near shores, in narrows and during tactical maneuvering. Here the coordinates of turning points (up to nine) are entered in the EVM, after which the course and distance to them from the ship's position are figured automatically, as is the time of arrival at the point with a given speed. Signaling the approach to a point to within a given distance is provided for.

In addition to the tasks enumerated, the MX-1105 can determine compass corrections, the ship's course during a maneuver, and so on. With a breakdown on the power network the equipment functions for 15 minutes from a built-in storage battery.

The processing of navigation data is automated in the MX-1105 SNA: The operator introduces initial coordinates, time, the date, antenna height, and so on. The search for signals of satellites and RNS stations, signal tracking, the measurement of navigational parameters and solutions to navigational problems also are fully automated. During operation only certain parameters are introduced manually--turning point coordinates, the correction for local time, numbers of the Omega system stations, and so on.

The modified version of the SNA, the MX-1105RN-S/M, takes account of features of operating navigational equipment aboard a submarine. A special program in the EVM computes the minimum time needed for receiving information from a satellite. Signaling about the collection of an amount of data sufficient for solving a navigational problem is provided for. After this signaling is activated the submarine can submerge without awaiting the end of the satellite's

pass within the zone of radio visibility. The foreign press notes that in some cases the antenna can be above the water's surface for only 4½ minutes. In addition, there is a provision for the manual input of orbital data on navigation system satellites for predicting possible observations, which precludes an additional surfacing of the submarine. These measures are aimed at increasing the submarine's concealment during observation of the SNS.

British naval specialists are studying the possibility of operating the MX-1105 aboard ASW aircraft, where this equipment will be employed primarily for operation in the Omega RNS network.

SURFACE SHIPS and auxiliary vessels use the MX-1102RN satellite navigation equipment of the American firm of Magnavox and the RSN-2 of the British Redifon Telecommunications. The MX-1102 has an operating mode similar to the first mode of the MX-1105 SNA, i.e., coordinates are determined according to satellite signals and reckoning between observations is conducted based on data from the log and gyrocompass. The basic specifications and list of tasks accomplished also coincide.

The equipment for a surface ship includes a main unit and turnstile antenna with preamplifier (a diameter of 625 mm, a height of 1,445 mm and a weight of 4.1 kg). The average time of mean cycles between failures is 23,500 hours. It is noted that the firm developed a universal printer for the MX-1102 and MX-1105 SNA which permits automatic relay of navigation data in the printer mode via the satellite communications system. Operators of shore services can automatically receive position coordinates of ships of interest to them by an encoded query.

The RSN-2 equipment functions similar to that of the MX-1102 SNA and accomplishes the very same tasks. One feature of it is the presence of a dual-frequency receiver which can be used to correct errors in navigational measurements arising from the ionosphere's effects, which considerably enhances the accuracy of observations. A dual-frequency cylindrical antenna with circular polarization and a built-in preamplifier is used for receiving satellite signals. It is reported that in addition to conventional navigational calculations, the EVM provides the capability of accumulating results of around 100 observations and obtaining elements of fix of a stationary ship with an accuracy down to 3 m by statistically processing the observations. It is also possible to predict the passage of satellites in the zone of radio visibility for 24 hours ahead. Equipment specifications are given below.

Mean square error of observations of SNS, m	38 plus 360 per knot of error considering ship speed during the observation
Receiver operating frequencies, MHz	150 and 400
Display	Single-line electronic board
Main unit dimensions, mm	240 x 500 x 636

Main unit weight, kg	38.6
Antenna size, mm:	
Diameter	194
Height	1,280
Electrical power (ac):	
Voltage, volts	100-125/200-250
Frequency, Hz	47-63
Rated input, watts	250
Ambient temperature, °C:	
Main unit	0-50
Antenna	From -40 to +70

The foreign press notes that in addition to the British Navy, the RSN-2 is being installed in some ships of other European NATO countries as well as aboard destroyers of the MEK0360 project being built for Argentina in the FRG.

The effectiveness of navigation using the SNA was confirmed during the Anglo-Argentine conflict over the Falkland (Malvinas) Islands, when the government of Great Britain sent two-thirds of the British Fleet into the South Atlantic in an attempt to restore the islands' colonial status. It is emphasized that during combat actions the British nuclear submarine "Conqueror," fitted with the MX-1105RN-S/M SNA, arrived at the location of the Argentine cruiser "General Belgrano" with high accuracy and sank her.

6904
CSO: 1801/175

FOREIGN MILITARY AFFAIRS

LIST OF JOURNAL ARTICLES IN 1983

Moscow ZARUBEZHNOYE VOYENNOYE OBOZRENIYE in Russian No 12, Dec 83 (signed to press 15 Dec 83) pp 93-96

[Passages rendered in all capital letters printed in boldface in source]

[Text] LEAD ARTICLES

GENERAL MILITARY PROBLEMS

GROUND FORCES

PHOTO REPORTS

6904
CSO: 1801/175

END